The Virginia Greenways and Trails Toolbox

A How-To Guide for the Organization, Planning, and Development of Local Greenway and Trails Programs in Virginia

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prepared for
Virginia Department of Conservation and Recreation
Virginia Trails Association

by
Parsons Harland Bartholomew & Associates, Inc.
Richmond, Virginia

Acknowledgments

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We wish to thank the Pennsylvania Greenways Partnership for their generosity in granting permission to use material from its how-to manual, *Creating Connections*. The *Toolbox* includes many ideas, recommendations, and excerpts from that publication.

Thanks also goes to the Brandywine Conservancy, Inc. for permission to include the sample easement found in Appendix VIII. The easement was borrowed from the Conservancy's publication, *Community Trails Handbook*, which is an excellent reference for practical steps to be taken in the promotion and development of trails.

We also found the book, *Greenways for America*, by Charles E. Little (The Johns Hopkins University Press, 1990) to be informative and inspirational, providing a rich sense of the greater social context in which greenways and trails are finding their place.

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Introduction

This manual has been prepared to provide Governor's Conference on Greenways and Blueways attendees a ready reference of information and contacts they will need in promoting and developing greenways and trails in their own communities. It is called "The Toolbox" because it has been designed to serve as a place to store conference session handouts and other materials that may be collected over time. The *Toolbox* is divided into six sections under the following headings:

- *Virginia Vision* General information about greenways and trails as they relate to Virginia.
- *Organization* - Forming and sustaining a greenway or trail advocacy group.
- *Planning* - Master planning and getting the project accepted by the public and government.
- *Development* - Acquiring the right-of-way and constructing physical improvements.
- *Operations* - Administration and maintenance of completed facilities.
- *Appendix* - Supplemental items, a resource directory (*Green Pages*), and bibliography.

As you collect materials from the sessions at this conference, you can place them in the *Toolbox* in the appropriate section for easy future reference. As your collection of material grows you could move the expanded sections to a separate volume.

We feel certain that you will enjoy the conference and get much from the individual sessions. We hope that you also find this *Toolbox* to be a useful device as you pursue your greenway and trails programs.

Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AHRI	American Heritage Rivers Initiative
AMC	Appalachian Mountain Club
ATV	All-terrain Vehicle
Corps	United States Army Corps of Engineers
CMAQ	Congestion Mitigation and Air Quality
CTB	Commonwealth Transportation Board
DHR	Virginia Department of Historic Resources
DCR	Virginia Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
DGIF	Virginia Department of Game and Inland Fisheries
EASI	Environmental Alliance for Senior Involvement
FOP	Friends of the Potomac
TEA-21	Transportation Efficiency Act for the 21st Century
MPO	Metropolitan Planning Organization
USFS	United States Forest Service
NGO	Non-Governmental Organization
NPS	United States National Park Service
NRCS	United States Natural Resources Conservation Service
RFQ	Request for Qualifications
RSVP	Retired Senior Volunteer Program
RTC	Rails-to-Trails Conservancy
ROW	Right-of-Way
SCORE	Service Corps of Retired Executives
SHPO	State Historic Preservation Office
STB	Surface Transportation Board

Acronyms and Abbreviations (cont.)

USGS	United States Geological Survey
VBO	Virginia Business Opportunities
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
VOF	Virginia Outdoors Foundation
VOP	Virginia Outdoors Plan 1996

1. Virginia Vision and Trail System

Connecting our CommonWealth

Greenways and trail systems begin with the vision of a group, or individual, interested in recreation, conservation of natural environments, transportation, or simply enthusiastic about the outdoors. This section is intended to familiarize readers with common terminology and current ideas about how greenways and trails fit into, and enhance, the Virginia landscape.

In *Greenways for America*, author Charles Little chronicles the evolution of the greenway movement, beginning with Boston's "Emerald Necklace," a system of parks designed by 19th-century landscape architect Frederick Law Olmsted (see Bibliography). Little characterizes the greenways movement as "citizen-led". Since the time of Olmsted, across the country and in Virginia, greenways and trails have been proposed and created under the leadership of those who have a vision, articulate that vision, and recruit others to make it a reality.

The Vision of Greenways and Trails for the Virginia Landscape

Greenways and trails will play a key role in the preservation and enhancement of the Virginia landscape. By protecting and providing access to the abundant natural and cultural features found throughout the state, representative areas of the many periods of human habitation will be available for future generations to enjoy. When viewed overall, the land has not changed for thousands of years. Those who inhabited Virginia after the last glacial period looked at much the same rolling hills and mountain ranges as we do today. Native Americans canoeing the many tidal creeks around the Chesapeake Bay saw the same broad marshes against wooded uplands.

As the Europeans settled and expanded into new territories, they converted large areas of Virginia into agricultural landscapes. Some moved into the mountains creating settlements in the hollows and on gentle ridges overlooking the valleys below. Later, canals and railroads began to cross the land and weave along the rivers, and cities developed at the intersections of these important new routes.

But, the landscape resulting from widespread use of the automobile is the landscape that most Virginians are now exposed to on a daily basis. From a recreation and heritage preservation point of view, there is a need to make the earlier landscapes more readily available. While the network of roads provides vehicular access to and through most places, only greenways can preserve the landscape itself and only trails can provide the individual with a connection to its unique qualities.

Access through the many Virginia landscapes created by eons of natural processes and centuries of human cultivation can be the theme that unifies the greenway and trail movement in Virginia. Priorities for state-wide linkage should be based on a framework of landscapes created by the imprint of human activity upon natural features, building local greenways and trails for preservation, recreation, and transportation. By focusing on the overlap of the two forces, natural and human activity, the emerging state-wide system would help preserve the essentials of both domains and would serve the broadest interest of Virginians and visitors.

Greenways and Trails

There are many types of greenways that serve numerous possible functions. This section defines greenways and a describes many of their functions. A particular greenway will likely have more than one function. In *Greenways for America*, Charles E. Little defines a greenway as:

> ***"1. A linear open space established along either a natural corridor, such as a riverfront, stream valley, or ridgeline, or overland along a railroad right-of-way converted to recreational use, a canal, a scenic road or other route.***
> ***2. Any natural or landscaped course for pedestrian or bicycle passage.***
> ***3. An open-space connector linking parks, nature reserves, cultural features, or historic sites with each other and with populated areas.***
> ***4. Locally, a certain strip or linear parks designated as a parkway or greenbelt."***

The *Virginia Outdoors Plan* (VOP) defines greenways simply as ***"Open space corridors that can be managed for conservation, recreation, or alternative transportation."*** Some greenways are designed to be used for recreation and non-motorized transportation, while others are designed for wildlife, biodiversity, and scenic beauty. Resources that greenways might connect

include: schools, playgrounds, forests, parks, historic sites, rivers, neighborhoods, businesses, and wildlife refuges. Greenways may feature a wide variety of activities and points of interest, such as hiking, bicycling, and horseback riding trails, sidewalks, streams and rivers suitable for canoeing and boating, abandoned or active railroads, scenic roads, and scenic easements.

Greenways and trails have many similar characteristics and often are combined, forming a greenway with trails passing through it. A trail can develop into a greenway when an area of land along the route becomes protected from incompatible land uses through purchase or easement. When first proposing and working to establish a greenway or trail, proponents should be cautious about how they use the two terms. While establishing a greenway may be acceptable to contributing and adjacent property owners, trails and associated activity may not be. Conversely, some property owners may be comfortable donating an easement for a trail across their property, but become uneasy if they think that it will lead to solicitations for controls on a larger portion of their land. Therefore, if establishing a greenway is the primary objective, it should only be called a greenway. If a trail is being developed, references to greenways can accidentally complicate the issue. Certainly, if the goal is both, use both terms, but use them precisely when selling the ideas to landowners.

Greenways and Trails Delineate Corridors

Greenways often follow the alignment of a natural or open space feature in the landscape, such as a river or a scenic road. Trails exist in a broader landscape and provide access to corridor, if only visually. Therefore, the area of concern for either is a swath through the environment which includes adjacent land, and possibly

Greenways and Trails in Virginia

(A Partial List)

Northern Virginia

Washington and Old Dominion Railroad Regional Park
Goose Creek Scenic River
Bull Run Mountains Preserve
Fairfax County Stream Valley Park System
Arlington County Stream Valley Park System
George Washington Memorial Parkway
Fountainhead Regional Park
Northern Virginia Trail Riders System
Appalachian Trail
Georgetown Pike

Southeastern Virginia

Colonial Parkway
Route 5 Virginia Byway
Virginia Beach-Chesapeake Canoe Trail System
Virginia Beach Bike-to-Beach Trails

Western Virginia

New River Trail State Park
Roanoke Valley Greenways
Virginia Highlands Horse Trail System
Blacksburg Bike Lane System
Appalachian Trail

Central Virginia

Virginia's Retreat Trails
Charlottesville Bike Lane System
Kanawha and Haxault Canal Walk
Lynchburg Area Trail System

areas beyond that, in addition to the land on which the greenway or trail rests.

Some corridors exist in an indirect relationship with the greenway or trail:

Virginia Byways are state designated roadways that recognize the beauty and cultural legacy of the local region through which they pass. There is nothing about the Byway designation that changes, or prevents changes, to the road itself, or the land along its route. Local governments are encouraged to use their planning authority to preserve the scenic and historic features along the road, and when they do, as in the case of Route 20 in Albemarle County, a corridor related to the Byway is defined.

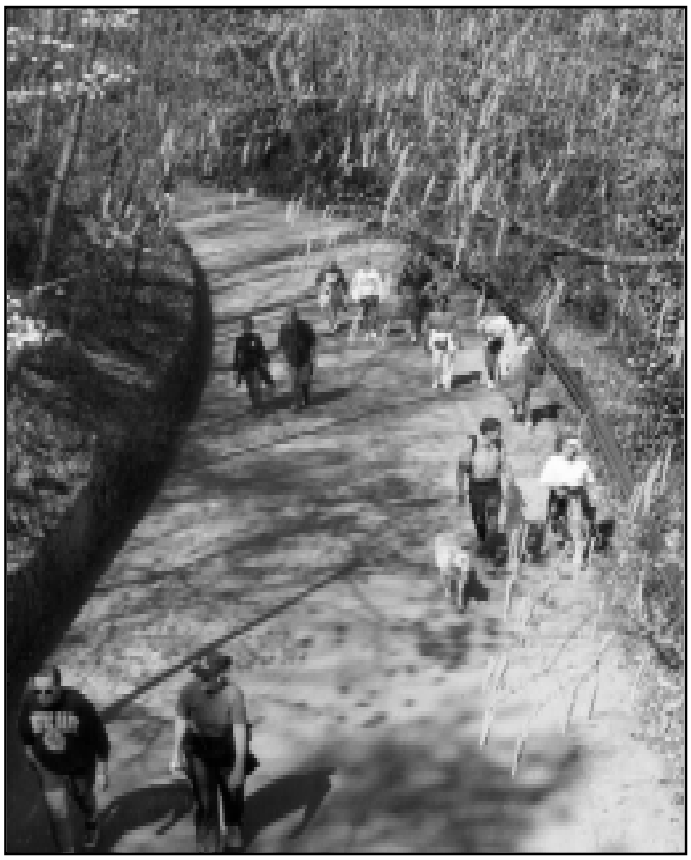
Blueways are rivers and streams used for recreation that occur primarily within the waterway. Some have been officially designated as federal or state scenic rivers, but any stream that serves as a conduit for travel and recreation is included in this category. The reason that blueways are considered a corridor is that for the recreational use to be sustained, adjacent land use and public access must remain beneficial to the recreational uses. This means that non-river oriented activities within the corridor must be managed appropriately through cooperative agreements, land use planning, and enforcement.

Heritage corridors can be formed by federal, state, or local action and normally define an area within which a particular cultural or historic theme or tradition can be appreciated. They are not really greenways or trails themselves, but may include greenways and trails that provide access to the heritage resources. An example is the Mattaponi-Pamunkey Trail in King William County and the Town of West Point. It includes no real estate of its own but formally defines key cultural and

natural features in the two jurisdictions which have relevance to the lives of the natives and early settlers in the region.

Greenway Types and Functions

A defining characteristic of greenways that distinguishes them from parks and preservation areas is their connective nature. Charles Little describes five major type categories in which greenways are commonly defined.



Roanoke Valley Greenway

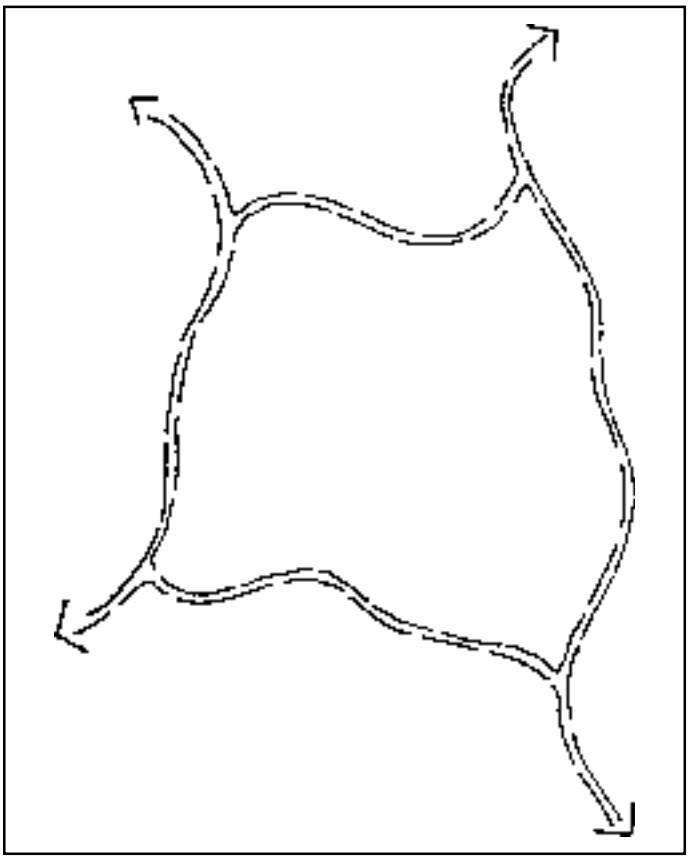
Urban riverside greenways are usually created as part of (or instead of) a redevelopment program along neglected, often run-down city waterfronts. A new example of this type is Canal Walk along the James River waterfront in Richmond.

Recreational greenways, featuring paths and trails of various kinds, often of relatively long distance. These are usually based on natural corridors as well as canals, abandoned railroad beds, and other public rights-of-way. The Washington and Old Dominion Railroad Regional Park in Fairfax County is an example of this type of greenway.

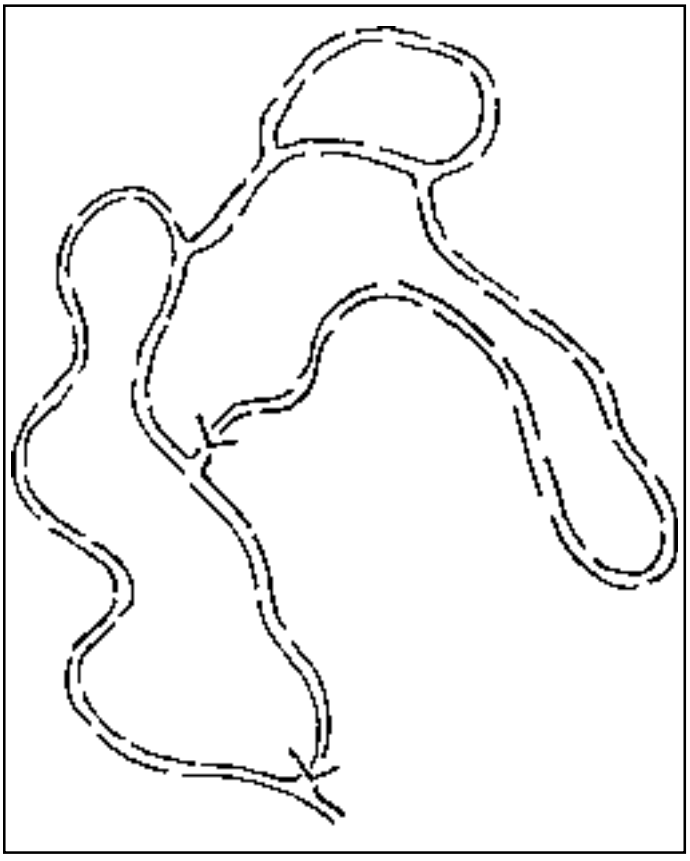
Ecological greenways, usually along rivers, streams and mountain ridges, provide for wildlife migration and "species interchange," nature study, and hiking. The Tinker Creek Greenway in the Roanoke area is an example of this type of greenway.

Scenic greenways and historic routes, are usually along a road, highway, or waterway. Pedestrian access is often provided along the route or at key points. The Blue Ridge Parkway is an example of this type of greenway.

Comprehensive greenway systems are usually based on natural landforms, such as valleys and ridges, but sometimes are simply an opportunistic assemblage of



System of Interconnected Trails



System of Extending Loops

various greenways and open spaces linked to create a local or regional network. The Roanoke Valley Greenway is an example of a comprehensive greenway system.

Trail Types and Functions

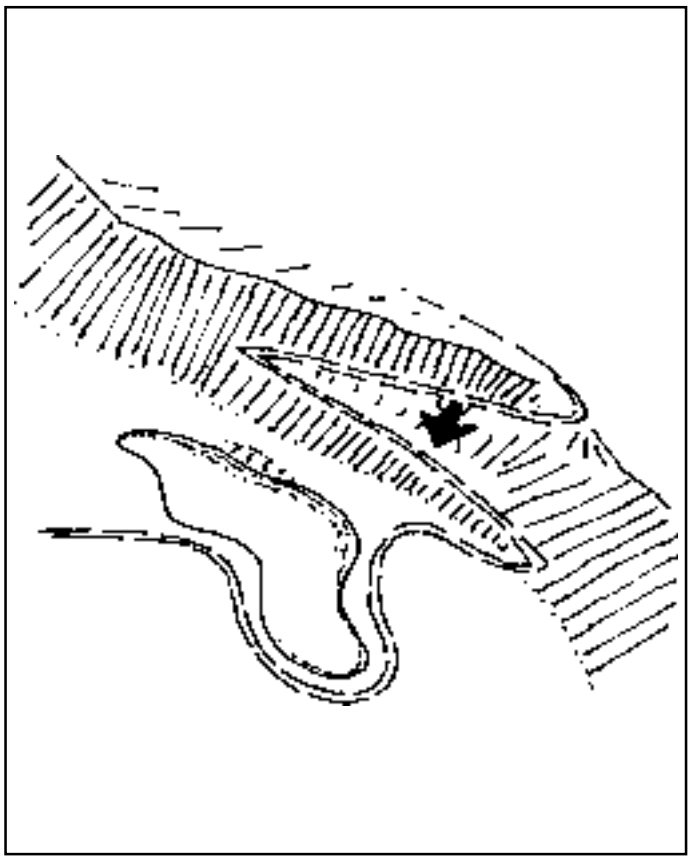
The *Virginia Outdoors Plan* (VOP) defines trails as ***"A linear corridor, on land or water, with protected status and public access for recreation or transportation (excluding scenic byways and highways)."*** This definition was adopted from *Trails for All Americans*, a report by the National Park Service (NPS) and the private coalition, American Trails. The VOP also states that the goals outlined in *Trails for All Americans, are* applicable to Virginia.

There are many types and functions of trails, just as there are a range of organizations that create and maintain them. Some are wholly located on public land and operated by a local recreation department, while others, such as the Appalachian Trail, are located on public and private land and maintained by a collection of volunteer organizations. Trails are used for relaxation; for intense physical workouts; for access to specific places; for the pleasure of walking nowhere in particular; and for getting away from the workday routine, as well as for getting to and from work.

Trails can occur as individual routes between two points, but often occur in groups, comprising a trail system. It appears that trail use increases when an individual trail is linked to a larger network of trails. When examining a whole trail system, one expects to see the quality of hierarchy. When enough land is available it is desirable to align a trail in a loop, so that one departs and return to the same point. When additional trails are built, subsequent loops should extend the original route to create opportunities for longer walks, again without retracing steps. This sequencing of loops outward from

the point of origin creates a pattern of hierarchy that is easily understood and followed by trail users on subsequent visits. No specific list of hierarchies needs to be followed; rather, a hierarchy should be designed and created in such a way as to make a trail more than just a line connecting two points.

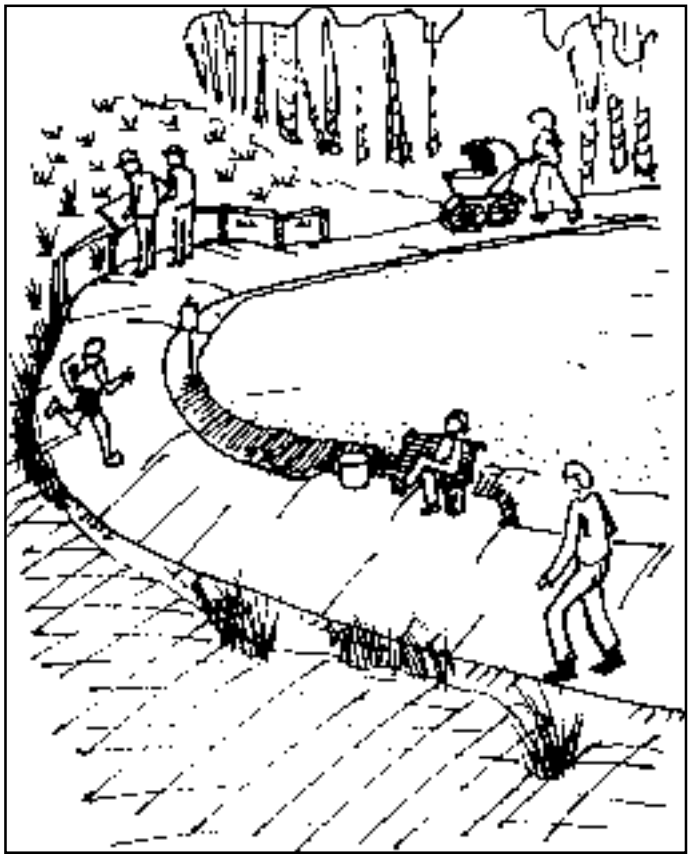
Continuity in a trail or trail system gives it a quality that will enhance the experience offered as well as encourage repeat use, and create a growing constituency. Continuity exists when the sequence of views and experiences along a trail occur in a smooth and logical order. For example, a trail that passes a pond then climbs a ridge to an overlook where the pond is again viewed has continuity. But if that trail climbed the ridge and never gave a view back to the pond, continuity would be lacking. Continuity is also created when a trail exposes users to a series of features in a recognizable order. A trail that follows a stream to its headwaters then climbs a ridge for the return loop would have more continuity than one that repeatedly switched back and forth across the stream and up and down the flanking ridges.



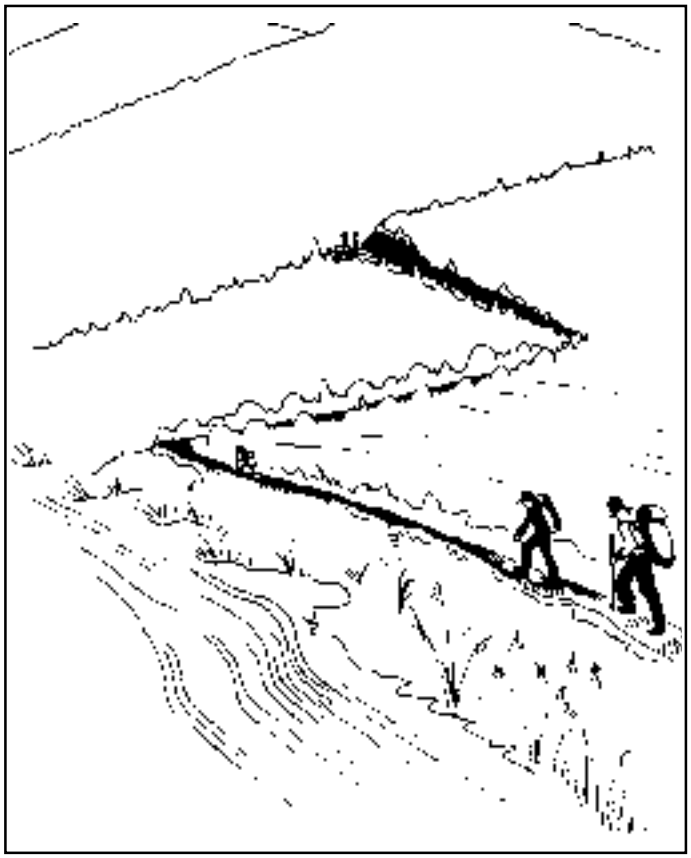
Continuity in Trail Experiences

Most trails have a variety of ways in which they can be used by low volumes of traffic. But as the level of traffic increases, the various methods that people use to propel themselves must be separated. The types and functional descriptions define the type of use intended and each type has numerous implications related to feasibility, design, cost, and management. These subjects are covered in the following sections of this handbook.

In general, there are single-use and multi-use trails. Many trails established in the past were intended for a single use such as walking. As their popularity grew and use increased, the variety of modes of transportation used on the trail also increased. Therefore, trails



Pedestrian Trail



Hiking Trail

designed for single-use have become multi-use trails. When planning a new trail, it is best to incorporate design for the nature of future uses, or to design it with specific limitations as to use. When use of an existing trail changes, the trail should be modified so that all intended activities are accommodated. Where space permits, single-use trails can be properly converted to multi-use by adding treads, or surfaces, that are designed and marked for specific uses. The types of trails listed below are single use that in some combinations can properly function on a single tread. Other types of trails should have a separate tread and in some cases a separate route.

Pedestrian trails are used by individuals and groups on foot or using low speed wheeled vehicles, such as strollers or wheel chairs. Pedestrian trails can offer relatively easy access to natural or scenic beauty or provide a safe and stimulating course for a vigorous outing. Generally, the presence of many others enjoying the same experience is acceptable. The surface material for these trails can vary from firmly packed crushed stone to asphalt or concrete. Most users do not expect to encounter much bicycle, skateboard, or in-line skate traffic on these trails and are discouraged from using them when the higher speed traffic increases. When providing access to a natural area, these trails have frequent stopping areas with benches, interpretive signs and displays.

Hiking trails provide overland access and usually require complete physical mobility. The surface of these trails is often uneven and consists of packed soil and naturally occurring vegetative debris. Hikers prefer trails that present physical challenges and offer dramatic scenic rewards. These trails can often be used by cross-country skiers during the winter. These trails are further subdivided into the most rugged "back country" trails and the less rugged "front country" trails. Because

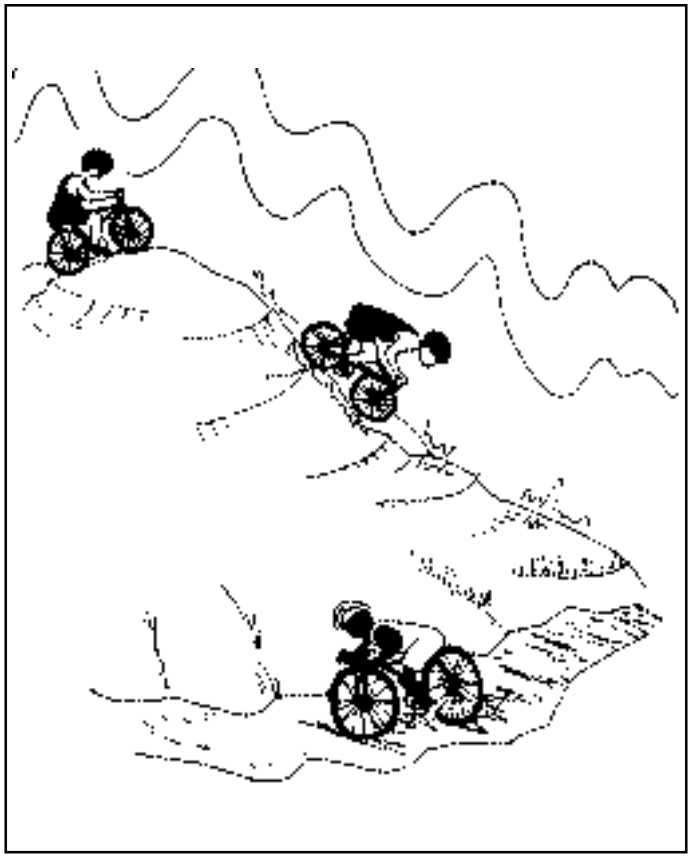
hiking trails lead away from developed areas, users often need to carry provisions with them as none are provided along the way.

Hike-bike trails are intended to combine walking and wheeled vehicles on the same tread. Because of the combined use, people using these trails on foot tend to be those walking or running for exercise. The immediate route should be safe and pleasant, but may pass through areas that would be less than appropriate for a scenic trail. The surface should be paved with asphalt or well compacted crushed stone. These trails should exclude motorized vehicles except electric-powered wheel chairs, but can be used in winter for cross-country skiing.

Equestrian trails are deigned for riders who enjoy travelling overland on horseback. Because horses do not require a specific trail surface, equestrian trails vary in width, grade, and construction. Parking at trail access points must accommodate trailer maneuvering as well as parking. Overnight facilities along equestrian trails should offer shelter and bedding for horses as well as accommodations for riders.

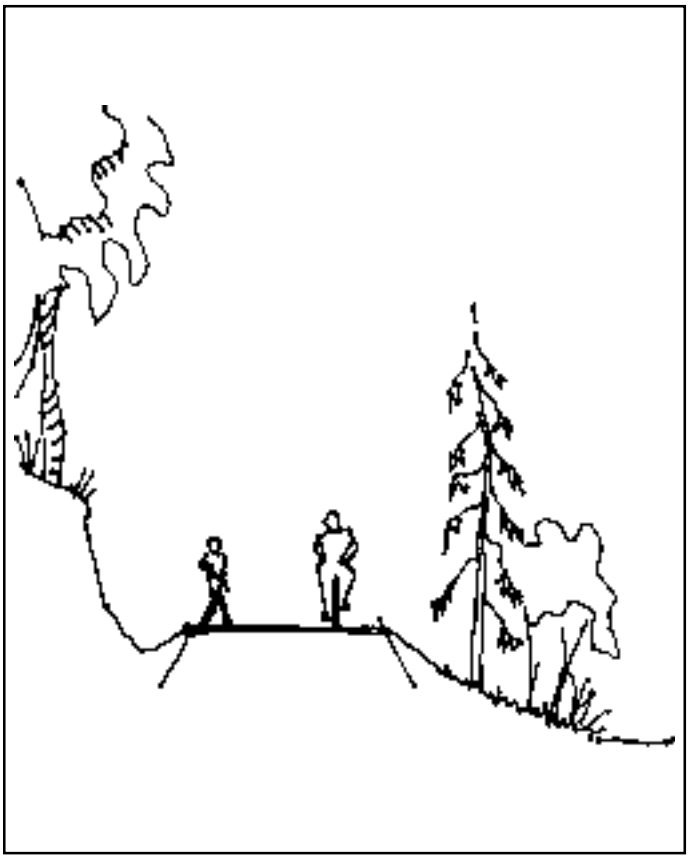
Mountain bike trails are very specialized trails that take riders through challenging terrain and present them with obstacles and at levels of risk normally avoided with other bicycle trails. Because mountain bikers travel rapidly and are focused on the course, no other users should use these trails, except possibly cross-country skiers in winter. In some areas, snow mobile trails may follow the same route during winter, but signs should clearly indicate seasonal changes and warnings if both types of winter users are present.

Multi-use trails are divided into two types; non-motorized and motorized. Non-motorized multi-use trails are for use by hikers, bikers, equestrians, and other

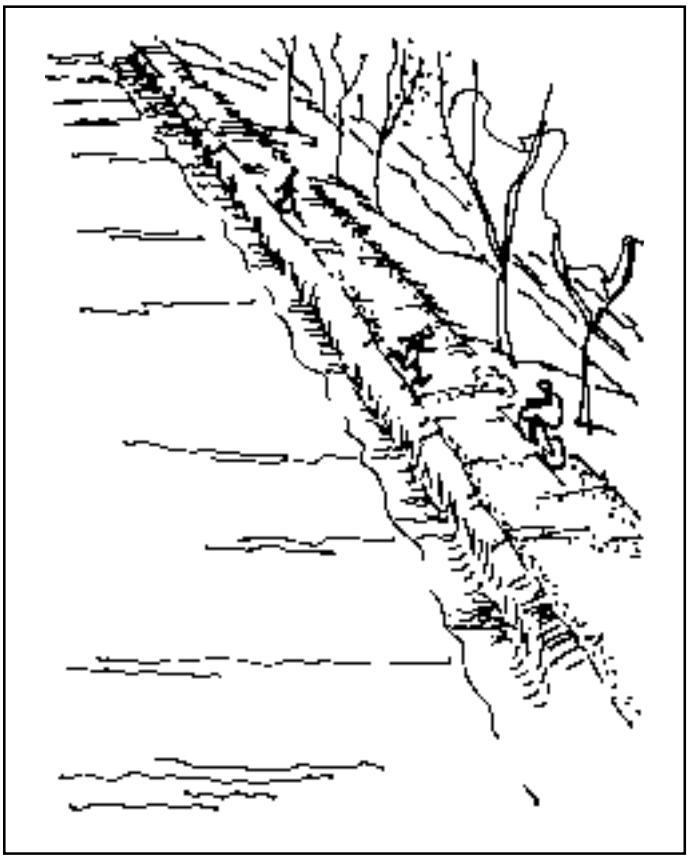


Mountain Bike Trail

Multi-use Trail



Rail Trail



Canal Tow Path

uses such as in-line skaters. Motorized multiple-use trails are also of two types; those intended for vehicles designed for off-highway use, such as dirt bikes and all terrain vehicles (ATV), and those intended for vehicles licensed for highway use. The Virginia Department of Motor Vehicles will not license for highway use a motorized vehicle having an engine size of 90 cubic centimeters or less. Trails for highway licensed vehicles, such as four wheel drive trucks and jeeps, called high clearance vehicle trails, often are also used by hikers and mountain bikers. Trails intended for the smaller, off-road vehicles can be managed as non-motorized trails through day of week or time of day restrictions. Due to the associated noise, most motorized multi-use trails should be located in areas away from non-motorized trails. The surface for these trails is normally paved with asphalt or macadam.

Bike routes are of three types; shared lane, separate lane, and off-road. A shared lane bike route is merely an identified route along which bicyclists ride in the same lane with motor vehicle traffic. Separate lane bike routes have a special bike lane, next to the motor vehicle lane, with specific markings to indicate exclusive use by bicyclists. These two types of bike routes are mostly used by riders traveling from place to place within an urban area. Off-road bike routes are sections of the bicycle system that are completely separate from the roadways. Bike routes are often used by pedestrians and others, but local ordinances sometimes restrict all non-bicycle use.

Rail-trails are trails that have been located along the abandoned bed of a former railroad track. They are very popular because they follow a gentle grade and often pass through undeveloped land and along rivers. Typically they are very stable and wide enough to accommodate multiple users, including cross-country skiers in winter.

Rails-with-trails are trails that parallel an operating railroad track. They are located within the right-of-way but typically not on top of the gravel embankment with the tracks.

Tow paths are pedestrian or multi-use trails beside old canals that were formerly used by the draft animals to tow canal boats. In many ways they are similar to rail-trails because of their level grades and often wide tread, and because they are near rivers. They are usually restricted to non-motorized use because of the number of users.

Water trails are recreational routes within or along bodies of water such as streams and lakes. There are two types; high-gradient water trails and blue water trails. High-gradient water trails are those that follow the course of a flowing stream or river. Blue water trails are those that follow a tidal shoreline or that of a lake.

Community Benefits of Greenways and Trails

The community benefits that result from greenways and trails are varied and extensive. In addition to contributing to the preservation of natural features and providing public places for recreation and enjoyment, they can stimulate to local economy. *Economic Impacts of Protecting Rivers, Trails and Greenway Corridors* (National Park Service, 1995) presents detailed information on a range of economic benefits that can be realized locally by the creation and effective promotion of various types of trails. However, most greenway and trail projects begin with the highest priorities being placed on the purely local, non-economical benefits.

There are numerous social benefits to greenways and trails. Among these are recreational opportunities, health and fitness, places to socialize, historic preservation, environmental protection, and community aesthetics. Connecting neighborhoods and bringing people into contact with each other helps to build a sense of community. A technical brief, *The Economic and Social Benefits of Off-Road Bicycle and Pedestrian Facilities*, by the National Bicycle and Pedestrian Clearinghouse contains additional information useful to trail planners (see Appendix XXIII: Bibliography).

Conservation of natural resources is a primary objective of the establishment of most greenways. The intent is usually to protect a strip of land along a stream, river, ridge, or shoreline from development or disturbance. By keeping disturbances back from the edge of a waterway, runoff can be filtered through the greenway to remove sediment and pollutants. By eliminating development along a ridgeline, views across the landscape will reveal its beauty for generations.

Preservation of historic structures, features, and landscapes can be facilitated through establishment of trails linking such sites to each other and to other public facilities in the area. Visitors to one site will go to additional locations when they are made aware of the linkage, helping the constituency of all sites to grow.

Flood control is increased when a floodplain, in addition to the legally protected floodway, is maintained in an undeveloped state. When a river or stream overflows its banks and floods the natural margin along its length, the extent of the flood is limited. By creating a greenway along flood-prone waterways, land owners reduce the extent of a future flood on each of their parcels.

Recreation is the primary justification and benefit expected from a new trail. Communities find that an attractive and safe trail system brings in more people to walk and ride. Trails designed for fitness activities get

heavy use and can attract visitors from outside the area to attend competitive or special events.

Transportation in and around a community can be improved by designation of bike routes and trails. When properly located to connect activity centers and populated areas to popular destinations, these facilities encourage commuters to travel by bicycle or foot, thereby reducing congestion.

Economic benefits from the creation of a greenway or trail flow to the businesses, the local government, and ultimately the people who reside in the area. Recreation, history, natural areas, wildlife, and beautiful towns are well documented generators of tourist revenue. During the early 21st century, more people in retirement will be traveling throughout Virginia, searching for beautiful and invigorating places to learn about and enjoy. Those communities that welcome and embrace these visitors with interesting and convenient attractions will be rewarded with new friends and increased revenue.

The needs of recreational visitors to a community support a wide range of small businesses including food, lodging, and automotive services. As popularity of a community grows, additional services will become necessary, creating opportunities for local entrepreneurs. Each new service and comfort that becomes available will make the area more attractive, in turn creating and increasing revenue to the local economy.

Local investment in a trail system and/or greenways can cause many local residents to recreate in their home community rather than traveling to more distant locations, spending locally the money they would have spent on trips out of the community.

When compared to many other types of recreational facilities, the generally low cost of trail development allows local governments to realize the cost savings and benefits more quickly. Indirect economic benefits, such as increasing property values, can also be expected when streams, ponds, and other natural features are preserved by greenways.

2. Creating and Managing Greenway and Trail Organizations

Forming the Organization

An agency or non-governmental organization (NGO) may take the lead on a greenway or trail project, or citizens may band together to form an *ad hoc* committee to start the process. Either the manager assigned by the agency, staff of the NGO, or a volunteer from the grass roots level will need to provide leadership from this stage onward. Leadership is the key ingredient in transforming vision into reality.

The ideal candidate for project leader will have strong communication skills and ability to foster teamwork. He or she will have knowledge of how government works and an understanding of local politics. The leader will also be a person who is sensitive to the needs and desires of many different types of users and who has tenacity and patience. The leader must be open to continual learning.

Duties will include but not be limited to: understanding the vision and the overall process and articulating them to others; guiding planning to accomplish each step; obtaining commitments and support; building relationships and partnerships; and building an organization or coalition of organizations. The leader will also conduct meetings and make presentations.

No one person is likely to have all the abilities and personal resources to carry an entire greenway or trail project single-handed. The most important thing to realize is that much of the work will be done by a team of interested people from all walks of life and in cooperation with professionals from numerous agencies. To do that, the leader must concentrate on building the organization and effective partnerships.

The organization, agency, team, or coalition engaged in the project will need to recruit other people with the necessary talent and commitment to undertake specific tasks at each stage of the project. Some of those tasks are listed below.

Recruiting Initial Support - In a citizen-led effort, the person or persons with the original vision may spread that vision informally among friends, colleagues, and families. Often fellow members of an existing club or organization are recruited as the first enthusiastic supporters. Begin by gathering to discuss the possibilities. Take a trip together through or along the corridor, being careful not to trespass. Discuss your vision of what you could be looking at. Accept input from everyone. If people begin to contribute their own ideas at this early stage, they are more likely to remain involved with the project.

Forming a Steering Committee - When a project is being led by an existing agency or NGO, form a steering committee. While you will welcome all those with interest in the project as supporters, and possibly as members in an organization, "hand pick" the steering committee members based on their talents, abilities, resources and commitment. Try to recruit representatives of all the communities along the corridor and representatives of potential user groups. Be sure to include residents in the neighborhood of the corridor and individuals in the business and civic communities as well.

The management agencies for any independently managed properties such as preserves, parks, and state forests in the corridor should be invited to steering committee meetings.

Defining a Purpose - A very important task at the first meeting of the Steering Committee is to define a purpose. Is your mission to convert a rail line to a trail, turn it over to the county recreation department and then disband? Is it to foster and promote greenways throughout a certain geographic region indefinitely?

The one who convenes the meeting may continue to act as chairperson or a chairperson may be elected. A recorder or secretary should be appointed. Although informal steering committees most often operate by consensus in making decisions, some decisions are important for future reference and should be recorded in minutes.

Choosing a Name - Another early job of the steering committee is to select a name for the greenway or trail. Name selection is important since it will distinguish the corridor from others, and will often be the very first words anyone hears about your project. It will denote the function of the corridor and connote something of local history, culture, and landscape. Begin using the name as soon as possible to build an identity for the corridor.

Obtaining Non-profit Status - If an existing not-for-profit group or government agency does not take the lead on a greenway or trail project, a separate non-profit organization will need to be formed to raise funds by charitable contribution, receive grants, and hold titles and easements. Section 501(c)(3) of the US Internal Revenue Code of 1986, defines and limits the activities and benefits for directors and officers of not-for-profit organizations. For more information visit the IRS website at http://www.irs.ustreas.gov.

Your organization will need to file articles of incorporation and adopt formal by-laws. You should obtain legal advice to guide you in the process. The organization formed may be a trail conservancy, a land trust, or an alliance of other organizations. You may consult with the other not-for-profit organizations in your area for advice, but there are some basic reasons for organizing as a corporation. One very important reason is so that the organization members are protected from personal liability in the operation of the facility and so that liability insurance can be obtained where necessary. You will also need to be a corporation to hire personnel, enter into contracts, and borrow money for development or operations.

Tax-exempt status begins with filing under Sections 170(h) and 501(c)(3) of the Internal Revenue Code. To receive tax-exempt status, earnings must not accrue to the directors, officers, members, or anyone else. Certain types of lobbying and political activities are also regulated. To file, you should request Forms 1023 and 1024 as well as Publication 557 from the IRS. Publication 557 will guide you through the necessary forms. Beware of using the word *foundation* in your application or as part of your organization name. Foundations do not enjoy all the tax benefits that public charities do. The IRS awards tax-exempt status retroactively to the date of filing. You should be able to start accepting deductible donations as of this date, but confirm this with your lawyer or the IRS.

Sharing Your Vision - Sharing the vision means reaching out to key members of the community and to the general public with information about your proposed project. This may involve introducing these persons to the concept of greenways and trails for the first time and educating them about their benefits. Support will ultimately come primarily from those who intend to use the greenway or trail, but non-users can also be important allies. Community leaders and individuals with an interest in overall quality of life and the economic development potential of the community may provide key support without having a personal interest in using the facility.

Building, Strengthening, and Managing Your Organization

Building, strengthening, and managing your organization effectively involves not only attracting and maintaining members, but also deciding on a management structure for the organization and developing and implementing a strategic plan. Most greenway and trail groups handle these diverse tasks by finding individuals to take the responsibility, or by forming subcommittees. The paragraphs below include information on key tasks.

Recruiting Supporters, Members, and Volunteers - The minimum level of individual support is simple approval of your concept and endorsement of your plan. At a higher level of support, you want people to join a greenway or trail organization, and participate in meetings and events. At the most enthusiastic level of support, citizens will become active volunteers and provide sustained efforts in making the vision a reality.

It takes time, energy, and money to recruit supporters, members, and volunteers. Interested citizens can demonstrate their support by attending public meetings and writing letters. Membership dollars and donations can provide operating capital, and volunteers can provide labor on all types of activities and connections to the community. Potential supporters, members, and volunteers may be solicited through articles in the paper, interviews on radio and TV, and presentations to clubs and organizations. Volunteers may be recruited from agencies such as the Retired Senior Volunteer Program (RSVP), the Service Corps of Retired Executives (SCORE), and the Environmental Alliance for Senior Involvement (EASI). Consult your local telephone directory for contacts.

Holding On to Supporters, Members, and Volunteers - If it takes effort to recruit citizens to your cause, it takes even more to hold on to them. The cost of initially recruiting a member and processing the membership may be such that no net income is realized by the organization until that member renews or is persuaded to give at a higher level.

Public Relations/Marketing - Writing, editing, layout, and design; photography and videography; publishing; public speaking; and creating audio and video tapes are capabilities that will be needed by the organization. An individual or individuals with media experience or public relations training should be recruited to lead this effort.

Fundraising - Grant writing, charitable foundation work, organizing fundraising events, and designing and marketing logo-bearing merchandise are required for the organization to succeed. A well-known community fundraiser should be recruited to lead this effort.

Work Projects - Clean-ups, preparing large mailing, distributing materials, construction projects, staffing events, and assisting with inventories will require special effort to organize and execute. Scouting groups, RSVP, and civic organizations, such as the Jaycees, can be recruited to assist with specific projects.

Managing the Organizational Structure - Managing the organization involves tasks such as convening meetings, providing information, raising operating funds, maintaining an office, and offering membership services. You will want the most efficient management possible so that valuable resources can be focused on the greenway or trail project itself.

Consider hiring a consulting firm for management, or cooperating with an existing non-profit group. This may be more cost-effective than establishing your own office and staff and will take advantage of the contacts and expertise of people already in the field.

Creating the Strategic Plan - If you are building an organization, it is useful to develop a written strategic plan. When your members, partners, and other stakeholders see that a firm plan to undertake specific actions is in place, their enthusiasm can be turned into active participation. The plan should come from the stakeholders with the aid of an experienced facilitator.

Creating the Vision is the process of determining what the organization should be in the future.

The mission statement is the first step in a strategic planning process. It states how the common interest of those involved is intended to be turned into action.

Defining goals is the second step in the process. Goals may include acquiring land, creating interpretive programs, strengthening the organization, making the public aware of the benefits of greenways and trails,

and connecting to other organizations. A goal is a specific and measurable accomplishment that fulfills part of the mission, and should be written as a statement such as: *"To educate the community about the health and fitness benefits of trails."*

Setting objectives is the third step that can be undertaken to achieve each goal. One objective for the above goal could be: *"Five hundred participants at the May Fitness Fair will be able to describe the health benefits of a trail."* Before adopting a set of objectives, check that adequate resources are available to carry out each objective. Also, it is important to identify at least one person responsible for implementation of each objective.

The **action plan** is the fourth step in writing a strategic plan. For the above example, action items could include: *"Contact the health fair organizers to schedule a presentation. Write a script for the presentation. Prepare a fact sheet about the health benefits. Give the presentation and distribute fact sheets."* Develop a timetable and estimate costs for each set of action items as part of the plan.

Evaluation is the last step in developing a strategic plan. This is the design of an ongoing evaluation process to assess whether or not each objective has been met. This process should include the collection of evidence or documentation. In the example above, one could give a quiz to the participants at the health fair and if 500 of them can actually describe the health benefits of greenways and trails, you know that the objective has been met.

Greenway and Trail Ownership Alternatives

At this point in your planning efforts, determine who will own and operate the corridor in perpetuity. The ultimate ownership/management structure often will not be known at this point. This is an important factor to address during the corridor planning process. The owner or controller of the property need not be the same entity that operates and maintains it, if appropriate agreements are drawn between the owners and operators. Consult legal counsel for assistance in designing the appropriate instruments if responsibilities of ownership and operations are split. There are advantages and constraints inherent in each of the possible forms of ownership some of which are discussed below.

Local Municipal and County Governments - Local municipal or county governments may take ownership. Where multiple municipalities are involved, each would likely own and operate their section according to agreed upon standards. An advantage to municipal ownership is that an existing parks or recreation department can be assigned to manage the corridor and, if the department has a good reputation, public doubts about maintenance and security will be alleviated.

Non-profit Associations and NGOs - A separate non-profit association or council may take ownership or control of a greenway or trail property. A non-profit organization often has freedom and flexibility in responding to public concerns and interests, and can be successful in bridging the gap between agencies and municipal governments. Local land trusts may secure a corridor until a managing organization is established.

State and Federal Government Agencies - Government agencies may be appropriate title holders.

For example, if the greenway is primarily for scenic or agricultural conservation purposes, the Virginia Outdoors Foundation (VOF) could retain the easement or hold title to the land. The Virginia Department of Conservation and Recreation (DCR) owns and manages many greenways and trails as part of its State Parks. Be sure that the agency's goals are consistent with yours and have written assurances as to how the land will be managed.

Private Landowners - Private landowners may open their land to recreational use by formal or informal agreement, and may sell or donate conservation easements while retaining other rights to the land. A corridor can remain in private ownership with a conservancy holding easements, or with simple access agreements from the landowners. The liability of landowners who allow the public to use their land is limited by Virginia Code §29.1-509 (see Appendix XI).

Obtaining and Using Public Input

Although a core team of the most dedicated individuals will outline the vision for a greenway or trail and develop the mission statement and initial concepts, they should be careful to keep their process open to the broader public. At certain points, particularly as the intended uses and alternative locations for the proposal begin to take shape, public input should be sought. Public input from the community is important for two reasons: first, showing a sincere desire to be sensitive to public concerns can build trust and engender goodwill; and, second, residents will have information that should prove beneficial.

Conducting Interviews - Adjacent landowners and public officials are key contacts. Members of potential user groups and neighbors in the general vicinity of your project should also be given the opportunity to give input. Getting their input through person-to-person interviews is recommended, and can double as education and outreach if the interviewer provides information about the project to the respondent. Interviews may be conducted by appointment, canvassing door-to-door, phone, or approaching passers-by in a public place, such as a mall or park. Another approach is to conduct group interviews by attending civic or social organization functions.

Using Questionnaires - A survey distributed by mail or printed in a local newspaper is less labor intensive than interviews, although the validity of the results of the latter may be questionable. Questionnaires and the material accompanying them may make the public more aware of your project if accompanied by a cover letter explaining who your are, what your project is about, why you want public input, and how it will be used. Include a copy of your mission statement or brochure.

Reporting Results - After collecting all data, convene a team to compile and analyze it. The results may be given in tables and graphs or reported in text. The information provided in your survey is one means to reach conclusions and make recommendations. The results, conclusions, and recommendations should be compiled as a formal report. This report will help to demonstrate both the need for your project when you apply for funds, and public support when you approach public officials and private corporations. The report, or at least an executive summary of the important findings, should be distributed to the media, your partners, public officials, and potential funders.

The results of simple "yes" or "no" questions should be tallied and reported as a percentage of total respondents. For example: "73 percent of the surveyed population had not heard of our project before." If demographic data is available, results can be broken down to give a more detailed picture (e.g., "35 percent of respondents

under age 35 rollerblade while only 5 percent of those over age 35 rollerblade").

For factual data, the results of open-ended questions might simply be reported as a list. The question, "Please name someone who may know about the history of the rail line," Will generate a list of names. The results may also be condensed using a count of the frequency with which respondents use key words or phrases. In an attitudinal survey, for example, one might report that , "30 percent of the respondents used language judged to be supportive of the proposed trail", according to criteria established in advance.

Using Public Input - Your team may draw conclusions from the data collected. For instance, "Since 80 percent of the respondents indicated that a greenway was desirable to protect Cobble Creek, and only 20 percent thought the area had recreational value, we conclude that the community prefers a protective buffer without recreational facilities along the creek." The results of the survey should be presented at an initial public meeting.

Planning an Initial Public Meeting - In the initial stages, the greenway or trail group should hold at least one public meeting. If your project has more than two or three municipalities involved, plan to hold several meetings, in convenient locations, to assure that each community has an opportunity for access to the information.

Conducting Public Meetings - An experienced facilitator should conduct the meeting. A recorder should note all comments and questions on an easel pad. Have a stenographer record the proceedings if you intend to use this meeting to satisfy a public input requirement established by an agency providing public funds for your project.

Agenda Items and Tips

1. **Registration (use a sign-in roster; hand out agenda and materials)**
2. **Begin meeting (moderator summarizes the purpose of the meeting, introduces sponsors, reviews agenda, and states ground rules)**
3. **Introductions (participants give name and affiliation)**
4. **Presentation (speaker, videotape, or slide show on greenway and trail basics)**
5. **Opportunity for questions and comments on presentation**
6. **Overview of specific project (use slides, maps, charts)**
7. **Opportunity for questions and comments on overview**
8. **Discussion (participants give information, input and discussion on project, possibly in break-out groups or in workshop format)**
9. **Summary (report from groups on points of discussion)**
10. **Closure (moderator introduces next step in process and invites interested citizens to continue participation)**

Be as open as possible but carefully choose which questions to answer. For instance, you should decline to answer questions of a confidential nature, such as those relating to parcels that are under consideration or under negotiation.

If it seems that participants have more questions and comments than time allows for, discuss the possibility of hosting a follow-up meeting in the near future.

Working with Landowners and Neighbors

While you will be directly involved in negotiations for sale or lease of land or easements with the owners of property needed for the corridor, it is also important to consider the adjacent landowners, since they may be affected by your actions. As you begin research to determine parcel ownership within the corridor, also gather information on adjacent landowners. This section gives information on identifying landowners and abutters, communicating your vision to them, understand their needs, and obtaining permission to enter their property to continue your research.

Identifying Landowners - To identify landowners, go to the tax assessor's office for copies of the tax parcel maps for each parcel of land in the project corridor. These maps will also show the boundaries of individual parcels. While at the tax office get the current owner's address, and the parcel number, which will be used to check the chain of title on each separate parcel.

If the proposed corridor is not under the ownership of a single entity, collect documents on each individual parcel. Start a file on each property in and abutting the corridor. Include a print-out of the tax map and the owner's name and address in each file. Keep copies of all correspondence with the owner, and any additional information gathered about the parcel.

Making Initial Contact With Landowners - The next step is to contact and arrange to meet with each landowner to introduce the group, and its mission and vision. This will help to establish a positive relationship and open lines of communication. During this meeting, ask for more information about their land and request permission to conduct further research on their property.

On a cautionary note, keep in mind that at this stage, it is unknown if the whole project is feasible. It would be premature to ask for donated land, an easement, or to enter into any kind of negotiation. If asked about the conveyance of land, answer openly and honestly that additional research of the property is needed and that a master plan must be developed. Inform the owner that consideration will be given to alternative alignments for the corridor. Be careful not to jeopardize any future bargaining position or to give the landowner false expectations.

Obtaining Permission to Enter the Property - A major goal of the initial meeting is to obtain the landowner's permission for the investigative team to enter and cross the property. They will need to research the historical and natural features to see of the parcel should be included in the corridor alignment. The landowner will probably be concerned with accepting liability for accidents. Virginia Code §29.1-509 protects landowners from liability for granting permission for this access. The code, a sample permission form, and liability waiver are included in the Appendices. Offer to sign one each time you enter the property. Enter the property only on dates and at times prearranged with the landowner. When scheduling sessions for property research, invite the landowner to see what is being done. This will satisfy his or her sense of curiosity, continue to build a sense of trust, and promote interest in the project.

Identifying Neighbors - Neighbors can be identified by using the tax maps. In addition to landowners who hold adjacent property, identify tenants, both residential and nonresidential, of those properties. This is best done by having local supporters identify property owners or by touring the area and knocking on doors.

Making Initial Contact with Neighbors - Plan to meet with neighbors individually, if there are only a few, or invite them as a group to a special "neighborhood meeting" to inform them of the proposal and to listen to any concerns and suggestions. Doing so will go a long way toward ensuring their cooperation and lessen the likelihood of neighborhood opposition.

Understand Landowner Concerns - The landowner may have a number of concerns, fears, and misconceptions. The biggest misconception of a landowner is that their land will be taken or otherwise reduced in value. They may fear that the trail or greenway will impose conservation restrictions that will somehow limit future opportunities to sell or develop land for profit. Another major concern is the landowner's sense of privacy and security. Open communication can address these concerns and dispel fears and misconceptions.

Working with Public Officials and Non-Governmental Organizations

This section presents an overview of the function of various governmental and non-governmental entities as they relate to greenway and trail development. Federal, state, and local entities will likely be involved in your project. Some have a regulatory function and need to be fully informed to discharge their duties to protect and serve the public. Others will be potential resources to be used by the greenway and trail group. Some will have only a peripheral involvement at certain stages of the project. Others will be involved from start to finish through the life of the greenway or trail.

Local and State Government Agencies

Greenway and trail groups will most often start with contacts at the local government level and work with regional, state, and federal agencies later. One rule of thumb for working with government agencies: virtually every agency, at every level, stresses that they need to receive basic information about new greenway and trail projects as soon as possible in order to be of most help.

Parks and Recreation Departments - These agencies develop and maintain facilities for formal and informal recreation, run programs, and promote recreation. They may conduct an assessment of the community's needs and may have plans and budgets for acquiring additional land for parks and recreation.

Planning Departments and Commissioners - Planning for greenways and trails may be assisted or facilitated by the planning department and planning commission. These local entities guide development in order that community infrastructure, such as streets, water supply, and sewers are adequate, and that development is consistent with adopted future land use plans, density goals, the need for housing, business, recreation and industry, and the need for protection of natural resources. They can also recommend capital improvement projects, such as acquisition of land for conservation and recreation. The planning director will know whether there are current proposals to develop land needed for the greenway or trail corridor and adjacent properties, which could influence your designs.

The locality should have a comprehensive plan that outlines how it will guide growth and protect resources. A proposed trail or greenway should be consistent with

the comprehensive plan. If not, a greenway or trail group should request that a revision to the plan be considered to incorporate the greenway or trail.

Engineering/Public Works Department - A locality may have an engineer or engineering department, or may contract for engineering services with a local firm. Local government engineers and landscape architects can be good resources for technical assistance.

Tourism Promotion Organizations - Tourism promotion organizations take a comprehensive approach to promoting tourism and developing attractions within a region. These organizations can help market a greenway or trail beyond the locality and contact potential greenway and trail supporters and users, such as hotels, restaurants, travel agencies, and bus tour operations stimulate interest in the region.

Soil and Water Conservation Districts - The Soil and Water Conservation Districts can assist greenway and trail groups with technical expertise and information about soils, erosion, farming practices, land use, habitat improvement, and wetlands protection. The Districts may also manage agricultural easement programs. Check your local phone book or contact the Virginia Association of Soil and Water Conservation Districts for listings (see Appendix XXII: Green Pages).

The Virginia Department of Conservation and Recreation - In addition to operating and maintaining greenways and trails within the state parks, DCR supports greenway and trail development through technical assistance and a special grant program. The Virginia Recreational Trails Fund program provides funding for public and non-profit projects. In the fiscal years 2000 and 2001, grant funding for this program will be approximately $1 million each year. The match requirement is 20% of the total cost of in-kind services. Grant applications are due on January 31 each year. In 1999, funding in the amount of $1,254,163 was awarded to trail projects. See the Green Pages for contact information on this grant program and for technical assistance. DCR also provides guidance for property owners seeking property tax abatement for lands designated for long-term or permanent open space use.

The Virginia Department of Transportation - The Virginia Department of Transportation (VDOT) oversees design, construction, and maintenance of most of Virginia's roads and bridges. VDOT also supports alternative transportation infrastructure other than railroads and public transit systems. Planning for most VDOT-funded projects in urbanized areas is initiated by local governments and made part of the regional transportation system through the Metropolitan Planning Organization (MPO) process. Planning for transportation in areas not covered by an MPO is accomplished by local governments working directly with VDOT district offices. Each year a Six-Year Improvement Program is adopted by the Commonwealth Transportation Board (CTB) which includes all approved and funded projects. In addition, the CTB holds nine District Preallocation Hearings throughout the state each spring to solicit public input for the Six-Year Improvement Program.

Greenways and trails can be incorporated into local transportation plans when they have strong local support. Pedestrian and bicycle improvements can also be included in street reconstruction projects and the development of new roads, especially when dedicated supporters consistently make their wishes known at local planning commission and governing body meetings and hearings.

In the meantime, before your greenway or trail organization has its own major project to promote, you

may advance your interests by affecting the design of roadway projects already slated for development. When the local government or VDOT prepares initial plans for transportation improvement projects they normally conduct a public information meeting. In that meeting they explain the need for the project and ask that ideas and concerns held by the public be stated for consideration in the project development process. When a group enters the process at this stage, they can cause bicycle and pedestrian improvements to be given greater consideration in the location and design of the new facility. Later, as the project plans are developed and refined, additional public meetings or hearings will be held to keep the public involved. The greenway or trail organization must attend these subsequent meetings to monitor progress and to ensure that their recommendations are included in the roadway plans.

The Green Pages (Appendix XXII) contains a complete listing of VDOT administered federal funding programs that can be applied for financing trails. Two well-funded federal programs can be successfully applied in Virginia localities for a wide range of pedestrian and bicycle improvements; The Transportation Equity Act for the 21st Century Enhancement Program (TEA-21) and Congestion Mitigation and Air Quality (CMAQ). TEA-21 provides substantial funding for enhancements to road and highway projects administered by VDOT. TEA-21 replaces the ISTEA program which has funded pedestrian and bicycle projects since the early 1990's. TEA-21 should be even more advantageous to greenway and trails organizations because it includes more money that can be applied towards a wider range of transportation enhancements. CMAQ funding can be obtained for development of alternative transportation such as new routes that would enable commuters to walk or cycle instead of driving to work.

Your organization should be prepared for technical challenges in working with district engineers. They are trained and experienced in the application of widely accepted standards for roadway design and safety and will expect your organization to submit well thought-out and detailed plans. Those plans will be expected to meet or exceed the many complex criteria and standards that are well established in the field of transportation engineering. Particularly challenging situations can occur where a trail runs along the edge of the roadway, where a trail crosses a road, where an entrance to a parking area is located, and where a trail is on a roadway bridge. If a greenway or trail facility is expected to increase traffic or congestion on a road, VDOT may require improvements to the roadway to prevent degradation in the level of service for roadway users. In any case, when a trail is within a road right-of-way under the jurisdiction of VDOT, it is prudent to contact the local government and/or the applicable district engineer early for advice and direction.

Virginia Code Commission - The Virginia Code Commission codifies the laws and regulations of the Commonwealth and publishes them as sets of volumes, updated periodically. The *Virginia Code* includes the laws and the *Virginia Administrative Code* included the regulations. Each regulation is assigned a number consisting of a "title" number, which identifies the issuing agency, and a chapter and section number. For example, regulations promulgated by DCR appear in Title 10.1-200 - 400. Whole sets and individual volumes may be obtained from publishers in book or electronic form, as can periodic updates. Some public libraries and local government offices maintain copies of the documents. Both codes can be viewed from the General Assembly web page at http://leg1.state.va.us.

The Virginia Outdoors Foundation - The Virginia Outdoors Foundation (VOF) works with landowners to define scenic, cultural, and natural resource areas on their property that are appropriate for conservation, and serves as a repository for conservation easements donated to the state. The VOF currently holds 570 easements on 103,000 acres.

Virginia Department of Forestry - The Virginia Department of Forestry offers funding through the Urban and Community forestry Assistance Grants. This program encourages tree planting and education about sustainable urban forestry at the local level. A limited number of grants have been awarded that combine trail and urban forestry interests. Grants may be awarded to local governments, approved non-profit organizations, educational institutions, and others. The filing deadline is June 1, and awards are announced by July 1. See Green Pages for contact information.

Virginia Department of Environmental Quality - The Virginia Department of Environmental Quality (DEQ) administers Virginia's Coastal Zone Resources Management Program, which includes federal matching grants to local governments in Tidewater Virginia for a wide variety of programs to enhance and protect coastal resources. Grant funding is available for development of public access to coastal resources and for habitat improvement generally.

Virginia Department of Historic Resources - The Virginia Department of Historic Resources (DHR) is the state repository for all information related to archaeological and historic structures in Virginia. DHR records may be searched for information related to cultural resources and DHR staff prepare and review environmental assessments for state sponsored projects and grant applications.

Virginia Department of Game and Inland Fisheries The Virginia Department of Game and Inland Fisheries (DGIF) conducts research and provides information on game and non-game wildlife and habitat in the Commonwealth. DGIF biologists and managers conduct educational programs and prepare interpretive material for state facilities and for use in habitat management on private land. DGIF also develops boat ramps, piers, and other water access facilities around the state.

Virginia Marine Resources Commission - The Virginia Marine Resources Commission (VMRC) issues permits for construction and other activities that could affect such resource areas as submerged lands under tidal waterways and streams, beaches, and sand dunes. VMRC provides guidelines on how improvements in these resource areas must be implemented to be eligible for a permit. VMRC habitat and construction specialists should be contacted early in the planning process for any facility which could impact a stream, tidal shore, or beach area.

Working With Federal Agencies

Many federal agencies provide resources and other support for the development of greenways and trails. Often the federal programs are administered by a state agency, as in the case of the National Oceanic and Atmospheric Administration's Coastal Zone Resources Management Program which is administered in Virginia by DEQ. Other supporting federal programs and agencies include:

American Heritage River Initiative - The Potomac River and the New River have been designated by President Clinton as an American Heritage Rivers (AHR). The AHR designation will have a significant impact on local governments, non-profits and businesses that are located or operate within the Potomac River and the New River basins. The primary purpose of the

AHR designation is to streamline local access to additional federal funding and technical support. A river "Navigator" has been appointed with the sole responsibility of assisting local groups in accessing federal resources.

The Potomac River nomination outlined a variety of local projects and programs that will benefit from the AHR designation, with recreation being a major component. The Friends of the Potomac (FOP) is currently organizing it's administrative functions, and will serve as the liaison between the local communities and the Potomac River Navigator. Three councils will be formed to assist local communities in their participation in the AHR initiative. Interested parties should join the appropriate council to insure representation in the development of program priorities.

The three councils include: State and local government; business and agriculture; and non-profit. In addition there will be a Potomac Congressional Caucus, consisting of all members of Congress whose districts are located wholly or in part in the Potomac River Basin.

National Park Service - Within the National Park Service (NPS) is the Rivers, Trails and Conservation Assistance Program. This program provides technical assistance to communities and acts as a clearinghouse of essential information, researching and publishing useful information such as the guidebook *Economic Impacts Of Protecting Rivers, Trails and Greenway Corridors* (see Bibliography). Staffing the program are planners, landscape architects, communication specialists, and natural resource managers. The NPS Mid-Atlantic Regional Office, located in Philadelphia, serves seven states, including Virginia, which makes it a valuable partner in any project crossing state lines.

To obtain assistance from the NPS, contact a staff person as early in your project as possible for a consultation. They will help determine needs and what type of assistance the NPS should provide. Follow this consultation with a formal letter of request including your case statement. The Philadelphia Mid-Atlantic Regional Office receives approximately 100 requests per year, but can usually provide resources to only 25 different projects at any given time. All projects are undertaken as partnerships on a cost-share basis. Any in-kind efforts and expenditures can count as cost sharing.

The US Army Corps of Engineers - The US Army Corps of Engineers (Corps) is an agency that undertakes large construction projects for flood control or river navigation. The Corps cannot acquire land primarily for conservation or recreation but can include trails in designs for flood control projects, such as the walks along the flood wall in Richmond.

At the district level, the Corps conducts reconnaissance studies that define problems and opportunities related to water resources and identifies potential projects. Then, if the federal government and a local non-federal cosponsor agree on a potential project and commit to cost-share arrangements, a full feasibility study and environmental impact study are conducted. After approval by the Secretary of the Army or Congressional authorization, the district completes design and engineering for the project. Project construction is completed by private contractors under Corps supervision. Once created, management of facilities may be turned over to local authorities or retained by the Corps.

Corps civil works in Virginia are divided between four offices on the basis of major river watersheds. The Potomac River watershed is served by the Baltimore

District office, the New River watershed is under the Huntington, WV District office, the Pamlico River watershed is administered by the Wilmington, NC District office, and the balance of Virginia is under the Norfolk District office. Local facilities operated by the Corps, such as Philpott and Kerr reservoirs, are staffed by project managers who may be a resource in specific regions within Virginia. Greenway and trail groups should contact the Corps through local project managers where applicable. The Corps may help with consultation on trail design, construction, and maintenance. Technical assistance is available on floodplain management for greenway and trail groups owning properties located in a floodplain.

United States Forest Service - The United Forest Service (USFS) manages 1.5 million acres in Virginia's Jefferson and George Washington National Forest. These lands are managed for multiple uses and contain a number of trails and conservation corridors. The USFS will cooperate and collaborate on trails and greenways connecting to the forests. Its Forestry Sciences Lab conducts research on the best management practices and the health of forests. The USFS also publishes information that may be of interest to greenway and trail groups managing substantial areas of conservation land.

Surface Transportation Board - The Surface Transportation Board (STB), formerly the Interstate Commerce Commission, is the federal agency charged with overseeing rail line abandonments. All railroad companies that wish to abandon unprofitable lines must file with the STB. Greenway and trail groups can request notification of any such filings in their area of operation. Once aware that a rail company wishes to part with a line, the group may begin negotiations directly with the railroad for conversion of the corridor to trail use.

Although the STB may grant an abandonment, it will still seek to preserve the corridor intact for future transportation needs. A rails-to-trails group that can assume financial liability for the line may petition the STB to order that the line be set aside for rail banking. Rail banking allows for interim trail use while keeping the corridor intact for possible railroad reconstruction and reactivation. The STB may also be petitioned to impose a limitation on how the railroad disposes of a line. This is know as a Public Use Condition and can provide a reasonable period of time for your group to conduct research, create a plan, raise funds, and begin negotiation with the railroad for the eventual purchase.

More information about the abandonment process and about rail banking is included in *Secrets of Successful Rail-Trails* (see Bibliography).

Department of Labor - The Federal Disaster Displaced Workers Program, of the US Department of Labor, is designed to provide temporary jobs for workers displaced by disasters, and is a potential source of labor for greenways and trails groups during construction.

Virginia Trails Association (VTA) - The mission of VTA is to foster the appreciation, management, and establishment of trail systems. This is accomplished through coordination, education, advocacy, and community empowerment. VTA provides technical assistance, resource and referral information, education, and advocacy.

The Conservation Fund - The Conservation Fund produces publication lists and fact sheets on greenways and trail development and offers a grant program for advancing greenways.

Non-governmental Organizations

There are a number of national and state-level non-governmental organizations (NGOs) that are active on greenways and trails. Key groups are briefly described here. Contact information appears in the Green Pages (Appendix XXII). NGOs may provide technical assistance on a variety of subjects. Some may be able to participate as partners in greenway and trail projects and other may be advocates at the state and national level for policies and funding initiatives that support greenway and trail efforts.

The Rails-to-Trails Conservancy - The Rails-to-Trails Conservancy (RTC) is a national organization which acts as a clearing-house, providing numerous useful publications, and organizational and technical assistance on acquisition and development of rail-trails. The group is an advocate for rail-trail policies and provides education about the general benefits of rail-trails. If you are working on a rail corridor, the RTC should be contacted very early in the initial stages of project development.

Local and regional land trusts and conservancies - There are 23 individual land trusts and conservancies in Virginia (see Green Pages). These organizations hold land and conservation easements, and some specialize in the preservation of historic and cultural resources, farmland, and open space. All actively raise money for purchase of lands and seek donations of land and easements. They are experienced at title searches, property research, property management, and related tasks.

Trusts and conservancies may contribute to greenways planning and may conduct county or municipal open space inventories. They may also work with municipalities on planning and zoning to encourage preservation of open space.

Some land trusts and conservancies have staff that may include planners, landscape architects, resource conservation experts, and development and fund raising personnel. They may be able to advise, consult, and partner with greenway and trail groups. Land trusts may also provide management services to a greenway or trail group that does not yet have Section 501(c)(3) status or that wishes to share the burden of administrative work. Management services may include hosting meetings, creating proposals, and handling finances. Land trusts can help coordinate networking and are usually experienced at public relations.

Chambers of Commerce - A chamber of commerce is an association comprised primarily of businesses and industries, usually serving a single locality or region. There are other business associations, such as downtown merchants associations, that can be active in promoting greenways and trails. Concerned with the economic vitality of their service area, they may be interested in the quality-of-life benefits of greenways and trails and may point them out to executives looking to relocate their firms to a particular region. Others may seek to spur redevelopment in small towns.

Chambers may be able to assist greenway and trail groups in a number of ways. They may help with community contacts, host presentations about your projects, and provide contact with leadership in the business community to assist with fundraising and political support. They also can introduce greenways groups to developers to encourage the accommodation of greenway connections and open space in their plans. If the chamber in your area has an environmental or land use committee, they maybe willing to collaborate on your project.

Marketing and Publicity

The number of marketing techniques that can be used to gain exposure and name recognition for greenway or trail is limited only by your imagination. Methods to promote your project include special promotional events, brochures, fact sheets, guidebooks, and tangible products. This section provides general information about marketing and publicity, followed by tips on specific activities. Additional information can be found in the *Guide to Public Relations for Nonprofit Organizations and Public Agencies* available from the Grantsmanship Center (see Green Pages).

Creating a Marketing and Publicity Plan - After you have formed the greenway or trail group, and made your initial outreach to the public and to your partners, you should put together a formal marketing and publicity plan. Keep in mind the various audiences anticipated. One set of messages should be crafted specifically to appeal to key information providers, donors, and potential partners. A different message should be targeted to the general public and potential trail users.

Appoint a publicity committee or an individual skilled as a spokesperson, or a good writer, as soon as possible. If you do not have volunteers with skills in this area, consider bringing in an expert to train the committee and to oversee specific tasks. Use a professional employed by a partnering agency or hired from a publicity firm. A media or communications department at a local college is also a good source of volunteer expertise. The employee or public relations specialists of a local firm may also be recruited for pro bono work.

Establishing an Identity - People need to know what the mission of your organization is. Communications experts call this "establishing an identity." The goal is to get the message across and make it stick in the minds of your audience. The mission statement should be short and easily understood. If not, reduce it to a single, finely tuned catch phrase or tag line. A tag line might be "Connecting corridors for wildlife and people", or "Community connections keeping the county green".

In addition to the short tag line, it is helpful to construct a longer paragraph that explains, in reader-friendly language, your mission and current projects. This paragraph, called a standard paragraph or standard blurb, can provide a slightly more detailed picture of the organization. This should be included in every press release and can be used to summarize the mission when introducing the project.

A graphic artist can design a logo that will catch the eye and make a statement about who you are and what you are about. Use your name, tag line, and logo on all communications, including letters, press releases, signs, and promotional materials, such as T-shirts and refrigerator magnets.

Getting Media Attention - Media attention is vital to educate people about greenways and persuade them that your effort is worthy of support. Good media coverage includes announcement of activities before they occur and reporting on them after they are underway or complete.

Writing an effective News Release - To get the attention of editors and broadcasters you should periodically produce news releases. Based on information contained in the news release, reporters may call to get a story and prepare an article about project, or for information to be used in writing editorials.

For effective distribution of news releases, develop a database of newspapers, radio stations, television stations, and publishers of event calendars. In your database include the media outlets' names, addresses, phone numbers, fax numbers, and e-mail addresses.

Note the lead time each media outlet needs in advance of deadlines. Add to your list the names, addresses and phone numbers of individual editors and key reporters.

A news release should cover a single event and be no more than two pages, double-spaced. Begin with a bold heading identifying your organization and large letters identifying the item as a news release. Provide a contact name and phone number. If the item covered is time-sensitive or should be published immediately, type "For Immediate Release" after the heading. Otherwise, advise the recipient of a release date: "For Release January 1, 2001."

In the first paragraph, the one most likely to be read and printed verbatim, state your most important facts. This will be the familiar "who, what, when, where, and why." Put supporting information and details in subsequent paragraphs. Be sure to include a paragraph about the organization, its mission, and its current project (standard blurb). If the release continues to a second page, include "~more~-" at the bottom of the first page. To indicate the end of the release, include "~end~-" or "-0-0-0-" at the bottom. If the release is to be mailed, send it 1st class and include only one news release per envelope. News releases may be faxed, e-mailed, or hand delivered for immediate attention.

Writing an Effective Media Advisory - The main function of a media advisory is to invite the media to attend your meeting or event. Use a format similar to that of a news release, but clearly mark it as an "alert" or "advisory," and use the key phrase "you are invited to cover this event." Time the media advisory to arrive just a day or two in advance of the event. It, may be faxed or hand-delivered to gain immediate attention. Specify the time and date and include a detailed agenda, if possible. Highlight opportunities for photography and videotaping. It is very effective to provide a time when VIPs can be drawn aside from the proceeding to be questioned by reporters.

Submit information on your meetings and events separately to the community calendar or community bulletin board section of each media outlet for a free listing. This listing will be brief and limited to the event, time and place. It also should include a contact for additional information.

Creating a Press Kit - In advance of every event at which you expect media coverage, assemble a folder containing the case statement, contact information, photographs, fact sheets, and other material that could provide the press with substantive background information on the project. Add a detailed agenda for the event. Provide this press kit to reporters attending the event. They will not have time to get much background information before rushing off to their next story and will use the information later to check facts and amplify stories.

Brochures - A brochure is a promotional piece designed to be attractive, easy to read, and directed at a general audience. A brochure can be designed to be distributed by hand, picked up from a rack, or sent through the mail, and it may include an insert or tear-off section that the recipient can respond to you. A brochure may give membership information and ask for donations, or advertise the proposed greenway and trail to potential users.

Ways to widely distribute a brochure include arranging with a utility company to insert it in their monthly billing packet, or including it with a municipal newsletter. To advertise outside your area, take advantage of the brochure distribution service provided by many tourism promotion agencies. In your area, post the brochure on community bulletin boards in places such as grocery stores, municipal buildings, public libraries, and

community centers. There may be a bill posting service in your area that can be hired to place notices to the best advantage.

Banners - Banners can be hung across streets and from buildings, and window displays can be placed in storefronts to advertise your project or an event. Inexpensive vinyl fabric banners can be produced at local sign shops. Check with public officials about local ordinances governing display of banners and inquire about municipal or utility company assistance to hang them safely between street lights or utility poles.

Newsletters - It is a good idea to produce your own newsletter to be distributed to supporters and contacts. If you do, it should be published on a regular (monthly or bimonthly) basis. Members and supporters need to hear from the organization as often as possible. A frequent, photocopied, single-sheet publication done with desk-top publishing software on a home computer can be more effective, not to mention a great deal less expensive, than a larger quarterly publication.

Avoid having to use envelopes by incorporating a mailing cover panel into the design of the newsletter. If you have Section 501(c)(3) status, you will qualify for a non-profit-organization bulk mailing permit with the U.S. Postal Service. The permit, obtainable at your local post office, allows significant savings over first-class postage rates. Contact your postmaster for details and restrictions.

Send the newsletter to members, but also send a complimentary copy to key people, such as public officials, friendly reporters, and cooperating partners. Run a few hundred extra copies to distribute as handouts at upcoming events.

Holding Events - Each event held requires publicity, and each will provide exposure for your project. Events provide an opportunity for supporters to gather, socialize, and enjoy the fruits of their labors. The more cooperating partners involved in an event, the more successful it will be. If possible, hold events in conjunction with natural or cultural happenings. For example, conduct events and guided tours for the public on a solstice, equinox, or holiday. National Trails Day (the first Saturday of each June, sponsored by the American Hiking Society) provides an opportunity to attract attention to a proposed trail and to draw the public to a special event at an existing facility. River festivals during Virginia Rivers Month (June), organized walks and hikes on National Trails Day (the first Saturday in June), and Earth Day events (Earth Day is scheduled by local organizations and usually occurs in April) can also promote your project.

Races have become traditional events to promote trail values. Local running, bicycling, canoeing/kayaking clubs, and other civic organizations can help organize races. Add the suffix "a-thon" to any event and it doubles as fundraising and marketing. Clean-up activities, usually day-long events, are great ways to improve the greenway or trail, involve lots of citizens, and attract media coverage. Finally, breakfasts, luncheons, dinners, receptions, and formal dances are traditional events that can be used to draw attention to your organization and raise money. Numerous charities raise money with such events, and therefore it should be possible to recruit an experienced organizer within the community.

Products - A variety of products can be used to call attention to your project. These can include give-away items, such as bumper stickers and pins, or sale items, such as commuter mugs and water bottles emblazoned with the greenway or trail logo. Work with private enterprise to promote your project in other ways. For example, a local water-bottling company might produce a special label and provide water on the day of your

event, or a local winery might produce a commemorative label for a dinner event. Or, you may work with garment manufacturers to produce apparel with the project's logo. Arrange for local merchants to sell the clothing in their stores, providing royalties to the project, or sell apparel to your members and participants at events.

Finance and Funding

There are a number of investments that must be made to run your organization effectively. This section discusses planning for income and expenditures, delineates some cost categories, and relates strategies for obtaining funding. Due to the nature of the process for creating greenways and trails, more funds will be needed in some years than in others. An annual operating budget should be prepared to plan for routine organizational revenue and expenses. A separate fiscal plan will be needed to plan for anticipated major, one-time project expenses and to identify potential funding sources for each expense.

If you are creating a new greenway or trail group for this project, develop a budget for ongoing operational expenses and balance those expenses with revenue. Grant makers are likely to require a copy of your budget as well as an audited financial statement, with a grant application. Having a balanced budget will give potential partners a reason to take the project seriously, and will help contributors appreciate the magnitude of the undertaking and the value of their contribution.

Creating a Fiscal Plan - Major project expenditures include the one-time cost of conducting the feasibility study and creating the master plan. To form a comprehensive program to meet these financial needs, the finance and fundraising committee should develop a fiscal plan and revise it as needed. Once the study and plan are completed, cost for acquiring and developing the corridor should be known and maintenance and operating expense estimates should be available. Sources of funds to meet each expense must be identified and developed. The plan should include a time line showing major project expenditures to help keep fundraising activities on track.

A financial consultant, or a representative of an economic development organization, may be able to assist, as can a volunteer from SCORE. A small business development center associated with a local college may also provide planning assistance. Consult your local telephone directory for resources.

Start-Up - Start-up costs include expenditures to create an organization, set up an office, print initial brochures, recruit members, solicit donors, and conduct kick-off events. Small foundations and individual donors are often willing to provide seed money for start-up costs, hoping to catalyze additional investments in their community. As this money will not likely be renewed, it is critical to spend it in ways that will generate additional funds.

Organizational Operating - Few donors and grant makers are willing to contribute to annual operating expenses, such as rental office space, staff salaries, and overhead. Use membership contributions, conduct annual appeals, and hold fundraising events to generate operating revenue. An efficient organization will seek to minimize these costs by using subsidized office space, donated equipment, and shared staff.

Promotional and Fundraising Activities - Many organizations have difficulty obtaining initial funds to finance efforts to develop additional revenue. Money from memberships and individual donors should be earmarked for these efforts. Occasionally, individuals or businesses will underwrite the cost of promotional

materials. Local businesses may be willing to underwrite a fundraising event in return for positive exposure.

Matching Funds for Grants - For grants, a substantial local match is often required and commitments or pledges for these funds usually must be obtained, in writing, prior to application. Fulfillment of these commitments may be contingent upon a successful grant application. Municipal governments, corporations, and individuals may be solicited for these commitments.

Feasibility Study and Master Plan - Conducting a feasibility study and creating a master plan are major expenses that will require large sums of money. In Virginia, most greenway and trail groups raise local matching funds and apply for grants to fund these activities. Localities undertaking feasibility and planning studies typically fund them with general revenue from the annual operating budget. These funds are often augmented with grants. To undertake planning, as well as later acquisition and construction, localities may also devote money obtained from cash proffers or utilize "windfall" funds, such as bequests, fees from leasing public lands, or moneys from fines and settlements.

Acquisition and Development - Funds for acquisition and development are most often generated by a capital campaign. They may also be augmented by major grants. The efficient greenway or trail group will seek to minimize acquisition costs by obtaining land and easements through donations. Funds for acquisition and development are most easily obtained from public and corporate contributions. People are more likely to give when they see a tangible, "bricks and mortar" return. Keep in mind that donations of land can serve as a match for some state development grants. It is also possible to recoup some of this expense by reselling the land to a holding agency, such as leasing the land back to farmers, selling rights to resources, such as standing timber, or realizing a profit from utility leases.

Operation and Maintenance - Ongoing operation and maintenance expenses can be covered by user fees, membership dues, contributions, or proceeds from product sales. Cost sharing among governmental and non-governmental organizations may be spelled out in a maintenance agreement. Business and industry, or local civic organizations, may adopt a section of the greenway or trail and maintain it. An endowment can be established, possibly through a community foundation, to hold funds raised through a planned giving campaign, large contributions or bequests.

Raising Private and Local Funds - This section provides an overview of private and local funding sources for greenway and trails projects that can augment or provide local matching funds when seeking state and federal grants. *The Grass Roots Fundraising Book: How to Raise Money in Your Community* is a good source of detailed information on general fundraising efforts (see Bibliography).

Fundraising Events and Sales - The variety of fundraising activities is limited only by the imagination of your group. A few ideas have been mentioned in the preceding section.

Attracting Members - As the greenway or trail will provide direct benefits to the local community, fundraising efforts should begin with an appeal to the citizenry. People who subscribe to your mission should join the organization. Most greenway and trail groups charge a nominal membership fee, from $10 to $25. The usual strategy is to make membership affordable and build the membership rolls, then solicit members for larger contributions, in-kind donations, or volunteer

efforts. A higher fee is generally charged for businesses and agencies to affiliate themselves as members.

Members can be recruited through a brochure, a display, or an event. Most often, however, they are recruited by word-of-mouth. Once individuals are enrolled as members, they should be solicited for additional donations in an annual giving appeal.

In addition to monetary contributions, each member is valuable as an ambassador of the program. Be sure they are fully informed of the mission statement and all activities. Periodically remind them to help widen the circle of supporters by bringing guests to events, distributing membership brochures to friends and acquaintances, and providing referrals. Be sure to follow up and solicit each guest and referral for membership and additional contributions.

Members can be recruited to help raise funds in other ways. One successful strategy is to have member families host dinner parties at home for their friends on a certain night, and then convene everyone at a central location for entertainment, fundraising activities, and education.

Creating a Corporate Giving Program - A corporate giving program is an essential fundraising tool. Check your public library reference desk for directories of businesses. Begin by identifying corporations with a track record of community giving or a high stake in the quality of life in your community. Insurance companies, managed healthcare providers, and sporting goods manufacturers often see the benefits of supporting green way and trail activities. The Chamber of Commerce or other business associations may help identify good prospects.

Many corporations have a community relations officer or committee who controls a community gift or grant budget. Identify these individuals or committees and meet with them in person to present the case statement. Ask for a specific contribution and tell them how it will be spent. Often, once a corporation qualifies your organization for a contribution, they will automatically renew it in future years.

Many corporations match the charitable contributions of their employees. Ask donors if their employer has a matching contributions program and, if so, write to request a match. Corporations also support charities by sponsoring events.

Recognizing Contributors - Give some thought to how contributors will be recognized and rewarded. Common ways to thank and recognize individual members and donors include a pin, decal, newsletter subscription, member discounts at local cooperating merchants, and recognition in newsletters. Grantmakers and major donors may deserve a plaque at the project site or a certificate of appreciation to display in their home or office. Special members events (other than fundraising events) can be rewards as well.

One example of a successful recognition program is to have bricks embossed with the names of contributors, thereby becoming a permanent display and part of the construction material at a trail or greenway. Symbolic deeds and other tokens may be produced for similar campaigns.

Seeking Foundation Grants - Numerous large community, family, and corporate-foundations make grants to greenway and trail groups. Copies of directories of foundations can be found in local libraries. These directories provide information on each foundation's grantmaking history and philosophy.

One well known directory, *Environmental Grantmaking Foundations,* is published annually by Resources for Global Sustainability Inc. (see Bibliography). This organization also maintains a database of over 47,000 grant programs that can be searched by key words to determine the foundations servicing your area and type of project. Foundations can also be located by searching the Internet.

Small family foundations and charitable trusts are often managed by trust officers at local banks. A phone inquiry to the bank will suffice to identify these individuals. Arrange face-to-face meetings with trust officers to present your case and ask for assistance in identifying which trusts will fund activities related to greenways and trails.

Although there are too many individual foundations and grant programs to list here, a good example is the American Greenways Kodak Awards Program which is a partnership project of the Eastman Kodak Company, The Conservation Fund, and the National Geographic Society that provides small grants for the planning and design of greenways. The maximum grant is $2,500. Applications are accepted between March 1 and June 1 of each year. Awards are announced in early fall. Contact The Conservation Fund for information (see Green Pages).

Individual Donors - Fundraising experts commonly say that 85 percent of all donations are from individual donors. Your board or committee should identify people who are prospective donors, and ask donors to help by contacting people they know. In contacting individual donors, ask questions to ascertain their interest in the project. Do they hike? Do they bike? How do they feel about wildlife? Cultivating donors may take months or years. There is a donor life cycle – from first contact, through small gift, large gift, and legacy.

Continuing the Mission

Once your greenway or trail is operational, you deserve to settle down and enjoy the fruits of your labors. But, as a permanent part of the green infrastructure of your community, you are likely to find continuing opportunities to extend the mission and continuing challenges to the resources you are striving to protect. This last section discusses ways to extend the mission and assure continued protection of the resources you have chosen to protect.

Continuing the Legacy - As your greenway or trail becomes operational, your steering committee may evolve into a board of directors or a management team and shift efforts entirely to routine operations. Some serious matters will still need consideration.

As the greenway or trail becomes known in the community and beyond, user needs will change. Periodically conducting a user needs survey can keep you in touch with users and point to needed changes, repairs, or upgrades. The York County Heritage Rail Trail conducts such a survey and a sample is provided in the Appendix.

If leasing land, the management team must open negotiations for renewal before the leases expire. Other entities or individuals may come forward and offer conservation easements on additional land, for consideration by the steering committee. The potential for encroachments on your greenway or trail will require constant vigilance.

Extending the Greenway or Trail - If the team has the energy and enthusiasm, it can replicate success by initiating an extension of the corridor or creation of a new greenway or trail in another part of the region. Although it may never physically connect with the first trail, a second trail will add to the menu of regional

attractions. The second attempt can be easier than the first since the group already has established many of the necessary working relationships.

In trail extensions, a separate feasibility study and master plan are created for a major segment to be added to the trail. To do this, expand the current steering committee with members of communities in the area of the expansion, or create a separate steering committee for the new project and become a regional umbrella organization.

If a new goal is to create linkages around the region, a greenways opportunity map is a tool for visualizing corridor linkages and the potential for an integrated system of trails. You and your organization can also look forward to connecting with greenway corridors and linking trails statewide and beyond. There are several examples of multi-state greenway and trail corridors that include Virginia. For instance, the Appalachian Trail runs through most of the eastern states and the new East Coast Greenway is proposed to run north and south through the eastern half of Virginia. Also, national bike routes 76 and 1 both pass through Virginia.

Sharing Your Skills - As you master the process of greenways and trails planning, you will become a valuable advisor to others who wish to follow in your footsteps. Hosting or contributing to a regional conference on greenways and trails is one way to share information and resources. Conferences and forums have the benefit of attracting and educating the public and generating new supporters of the greenway and trail movement.

3. Planning a Greenway or Trail

Greenway and trail planning is a complex process that can be streamlined with the help of experienced individuals or consultants. There are two major tasks; determining feasibility of the project and creating a master plan. This section outlines the information needed and the steps to be taken in determining the viability of a greenway or trail and developing the concept documents needed to effectively promote the project.

Developing a Concept Plan

After you have established an organization to work on a greenway or trail project, the first critical task is to define the scope of the project. Fleshing out the vision and beginning to plan for how the vision will be made a reality is done through developing a concept plan. It is the first formal rendering of the vision, on paper. This is a document that will establish the framework for how the group will proceed to carry out the project. It is also an accumulation of information and a record of decisions.

The discussion at this stage is still broad in scope. As more information is accumulated, and as circumstances change, revisit some of these questions. Your organization will develop a dossier of information about the corridor. This information should be organized into a suitable file system and made available for reference.

Developing the Mission Statement

A mission statement is a one- or two-page write-up that can be presented to the public to explain the basics of the project. It can be illustrated with a map (from available sources) and perhaps with photos or sketches of interesting features in the corridor. It should list at least one person to contact for more information and contain the date it was created.

The mission statement is also the first fact sheet you will disseminate to a larger audience. It can form the basis of later brochures and articles. Give the mission statement to each member of your organization, prospective members, prospective funding sources, public officials, agency staff, news reporters, landowners, neighbors, and key community leaders.

Meeting with Key Individuals

When you have a concept plan, a mission statement, a sense of where the resources will come from, and an idea of the shape of the final project, you are ready to begin public outreach efforts. Public officials and community leaders should be informed directly by the group as soon as possible. Whenever possible, they should be enlisted as partners in your project. Even if they cannot contribute resources directly, their good will is important. They will also have information and suggestions to offer at some point in the future.

Step 1: Make a list of "who's who" in the community. Work to obtain a good cross-section of the people in the area your project will serve. Obtain names, addresses, and phone numbers of leaders in each of the categories listed below.

Step 2: Send a copy of your case statement along with a cover letter expressing your group's willingness to listen to their ideas and concerns. Include an invitation to attend any of your meetings, and mention that you or a member of your organization

A ìWhoís Whoî Listing of Contacts

1. Staff in local offices of federal, state and county agencies.
2. Elected officials at federal, state, local levels.
3. Planning commissions, park, and recreation department.
4. Environmental and conservation groups.
5. Local recreation-oriented business owners.
6. Chambers of commerce.
7. Leaders of industry and commerce.
8. Historical, cultural, and heritage groups.
9. Outdoor recreation groups.
10. Corridor landowners.
11. Owners of adjacent properties.
12. Media (newspapers, radio, TV).

would be willing to meet with them individually if they cannot attend the meeting. Follow up with a phone call to schedule the interview at a time and location convenient to them.

It is also a good idea, even on first contact, to include a simple survey or response card that the recipient of the letter can fill out and return. Simple questions might identify which user groups the respondent belongs to, desired trail activities, and whether he or she feels the project would provide a community benefit. Ask what level of support he or she or his or her organization could supply. A sample Partner Profile Survey is included in the Appendix II.

Meeting with Public Officials and Community Leaders To promote good relationships with people who may influence your project or influence public support for the corridor, obtain an interview, if possible, with each key contact. At the end of the interview, sit down for a few minutes and make notes while your memory of the interview is fresh. You may use theme when reporting back to your steering committee and as you move on to advanced stages of the project.

Meeting with Landowners - Landowners with whom you will need to negotiate easements or purchase of property are also people to consider for key initial contacts. Send the mission statement, make a follow-up phone call, and ask for an interview. It is recommended that individual meetings be set. Do not enter into negotiations at this point; just make them aware of your intent to create a greenway or trail, let them know what it is and how it will work. Be a good listener. Ask what benefits they see from the project, and what problems they foresee, as well.

Starting the Planning Process

The planning phase of greenway and trail projects is generally undertaken by planning staff employed (directly or by contract) by local governments or land management agencies. But in other cases, particularly when greenway or trail projects are being undertaken by NGOs, professionals in the employ of consulting firms are best equipped to deal with the complexities of planning tasks. The consultants should have expertise in landscape architecture, community and recreation planning, public participation techniques, civil engineering, and architecture. If you require the assistance of a consultant, you will need to develop a scope of work and conduct a search. After the consultant has been hired, you will play a supervisory role.

If the work is to be funded by public funds, local, state, and/or federal procurement statutes will govern the procedures to be used in hiring consultants. The procedures stipulated in the Virginia Department of General Services manuals; *Construction and Professional Services Manual for Architect/Engineers* (known as the A/E Manual) and the *Agency Procurement and Surplus Property Manual* (known as the Vendors Manual) establish procedures that are widely used throughout Virginia. The paragraphs below include information based on these manuals, but there are local variations in how the specifics are applied. Procurement regulations that apply to federally funded projects are stipulated by the funding program and are available from the federal agency or the state agency that administers the federal program.

A scope of work is a detailed outline describing what needs to be accomplished and the responsibilities of parties involved. Define the scope of work to fit your own situation and the requirements of the source of funds

for the work. To develop a scope of work, identify tasks to be done by volunteers, paid staff, consultants, and cooperating organizations.

Next, develop a **request for qualifications** (RFQ), which is an important step in the hiring process. An RFQ is a request for a consultant's qualifications and experience and should also include your mission statement, a generalized scope of work, time schedule, and selection criteria. Send the RFQ to five to ten firms that appear to be qualified. If required by a grant program, place an advertisement in a local paper. If using funds from a state agency, find out whether or not your must public a notice in the Virginia Business Opportunities (VBO) or elsewhere.

Consultants interested in the project will submit **statements of qualifications** in response to the RFQ. Review responses by the selection criteria outlined in the RFQ, including experience with similar projects in both size and scope, and understanding of the project, and the ability to complete the project on time.

Select several of those who submitted proposals for an interview. Ask each one to present their approach to the project during the interview. Prior to the interview, develop one set of questions to be asked at each interview. During the interviews, take notes on the responses to your questions.

After the interviews are completed, review material provided and answers to the set of questions. Using the selection criteria, list the consultants in descending order of their qualifications. At this time, develop a detailed final scope of work and request cost proposals from each consultant, and check their references. Negotiate the fee for the work with the highest ranked firm. If you reach an agreement with that firm. Prepare the contract. If you can not come to an agreement with the most qualified, you must negotiate with the second highest ranked firm. Once you have abandoned negotiations with any firm and moved on to the next, you may not reopen negotiations with the initial firm.

NOTE: Under Virginia procurement statutes, the process outlined above applies to the selection of construction industry professionals that are licensed by the Commonwealth. These include landscape architects, architects, engineers, and land surveyors. If you advertise the project targeting consultants that are not required to be licensed, such as planners, trail consultants, recreational consultants, biologists, foresters, etc., and you stipulate in the RFP that the process is Competitive Negotiations, you can require submittal of a cost proposal and base your decision partly on price. In any case you must, in the RFP, state the selection criteria that will be used and the relative weight that will be applied to each criteria.

The Feasibility Study

If a greenway or trail corridor has not been identified, planning may involve identifying important resources in a region or locality and then deciding how to best connect them. When the corridor has been identified, there are additional factors to consider in determining project feasibility. Conducting property research regarding the ownership, physical features, historical, cultural and scenic resources, and the environmental conditions of the corridor will provide information needed to determine if the project is feasible. Questions that must be answered before a project can be considered feasible include:

1. Is there a likelihood that the land can be acquired?
2. Is there public support for the project?
3. Is funding available to acquire property comprising the corridor?

4. It there an entity willing to take ownership and operate the greenway or trail?
5. Is funding available to develop, operate and maintain the corridor?

The Physical Inventory Assessment - An important body of information necessary to your feasibility study and master plan is the physical inventory. The physical inventory should cover the area included in the corridor in the original mission statement. If possible, consider gathering information on a wider swath to allow for the planning of alternative corridor alignments. The physical inventory may be conducted by a consultant, skilled volunteers, or volunteers with support and technical assistance from consultants.

The physical inventory should be presented as a map with layers of data and a written narrative describing the features. If the corridor is extensive, or if it passes through distinct habitat areas or diverse land uses, break the inventory into segments. Many subsets of information may already exist and can be compiled by volunteers.

The longevity of the inventory is a concern. The landscape is constantly changing as land use changes. Forests may be logged over, uncultivated fields may be overgrown, structures may deteriorate, new populations of wildlife may be located, and new archaeological finds recorded. If five or more years have passed between the completion of your physical resources inventory and commencement of your master planning effort, the inventory and plan should be updated. Recheck for updated data on structures, archaeology, and listed species during the feasibility study phase and just before the construction phase begins.

Natural Resources Inventory - This inventory may be compiled by a consultant or by volunteers using information from a number of existing sources. Consider working on this project with local environmental organizations and professionals in communities along the corridor.

Some local governments can provide topographic and geological maps of the area within their jurisdiction. The US Geological Survey (USGS) of the Department of the Interior produces topographic maps that are widely used for planning and are available in most architectural and engineering supply stores. Soil maps and information is available from regional Virginia Soil and Water Conservation Districts and some local governments. The hydrology (lakes, ponds, watercourses, wetlands) should be included as a data layer and is available from USGS. Aerial photographs and satellite images should also be available from county planning commissions and public utilities. VDOT has aerial photography of many parts of the state and can make them available on a limited basis. Local planning or emergency services agencies can assist in the identification of floodplains. Construction design and management plans need to address this type of threat.

The Virginia Department of Conservation and Recreation, Natural Heritage Program can be consulted for information on threatened and endangered species. The Virginia Department of Game and Inland Fisheries also maintains data on wildlife and aquatic populations and habitats. Schools, colleges, universities, and wildlife organizations also conduct inventories and have information on local natural resources. Topographical features such as rock outcroppings, and caves are probably known to local residents and may have local names. The local Natural Resources Conservation Service, a branch of the US Department of Agriculture, and local agricultural extension agents can provide information about agricultural land use.

When your natural resources inventory is completed, your steering committee and your planning consultants can review it to make suggestions and recommendations to protect or utilize the resources identified. For a trail, plan an alternative alignment to avoid a population of threatened wildlife or reroute the corridor to avoid a hazard. For a greenway, extend the corridor to include a critical environmental area, or realign your route to include attractive features, such as scenic overlooks.

Environmental Assessment for Hazardous and Residual Waste - If taking ownership of property, your organization may be assuming liability for environmental contamination on the site. To protect the organization from potentially catastrophic remediation costs, do not take ownership of a property without at least conducting a Phase I Environmental Site Assessment. An environmental engineer or other qualified professional should be hired to perform this work.

In conducting a Phase I Environmental Site Assessment, it is important to consider what lies on adjacent property, as its presence may affect the usefulness of the project site. If any indications of contamination are found, samples will be taken and analyzed. If contamination is found, additional tests may be necessary to determine the extent of the pollution and to estimate costs of remediation. When contamination is found, there are a variety of remediation options that can be employed to correct the problem. Your consultant can advise you about these. Contact the DEQ regional office to report findings and to get more information. DEQ can assist in creating an effective remediation plan.

If serious contamination is found, you may not want to acquire a given property. If the decision is made to go ahead with the acquisition, negotiate with the seller to remediate before closing the deal. If the problem is relatively minor, or if the parcel is critical to continuity of the corridor, consider assuming responsibility for the clean-up. Funds may be available through DEQ and EPA for clean-up (see Green Pages).

The Engineered Structures Inventory - If a railbed or roadbed is present, assess the condition of the surface and base (sub-strata) of the bed. If any bridges, tunnels, or grade crossings appear in the inventory, they must be assessed. An engineering firm can be contracted to perform this service, or if available, a local government engineer may conduct the study. Bridges and tunnels are critical to trails and a greenway or trail program can be the vehicle by which these abandoned structures are preserved.

The Public Services and Utilities Inventory - Identifying public services and utilities along the corridor, such as water supplies and sewer systems, can help with the planning and placement of visitor services such as water fountains, rest room facilities, and visitor center buildings. The local government engineering or public works department should have maps of these systems. Electricity and phone lines are important to visitor services, and also to security along any proposed trail. Conduct a drive-by assessment to see if utility poles are in place, and consult with the appropriate utility company about extending service where needed.

The Scenic Resources Inventory - Whether natural or man-made, the corridor will have aesthetic qualities. The visual attributes of the landscape should be assessed, and design and management practices should be planned to preserve and enhance the scenic value of the greenway or trail. In this assessment, the viewshed is identified, features are recorded, criteria are chosen, and a rating scale is developed. Then units of landscape are rated according to the criteria.

Scenic America is a national organization advocating long-term protection of America's scenic landscapes. They provide advice on designing parkways and on community planning. Technical information on evaluating scenic resources appears in their *Technical Bulletin: Evaluating Scenic Resources* (see Bibliography).

The Historical and Cultural Resources Inventory - The historical and cultural resources inventory can be based on information provided by the local historical society or the Virginia Department of Historic Resources (DHR). Local historical societies and cultural councils are important potential partners as well as sources of information. Note historical and cultural features that lie outside of the corridor because a constellation of attractions in close proximity will draw more visitors than any single attraction would in isolation

Begin your inventory by noting on your map all historic sites and districts listed on the National Register of Historic Places and the Virginia Landmarks Register. Add cultural resources such as museums and arboretums. Note any historic sites that could serve as commercial tourism-type establishments, such as bed & breakfast establishments, restaurants, and campgrounds. A good way to obtain additional information is to lay out a map at a public meeting and invite residents to comment and identify features.

Properties listed in or eligible for the National Register are given a limited amount of protection by federal historic preservation regulations. Placement on the Register also opens up opportunities for financial assistance. Consult the DHR for information.

Transportation Characteristics - A transportation planning consultant, your local planning department, or a VDOT official may be able to help you identify and describe roads, railroads, and other means of transportation affecting the proposed greenway or trail. Attracting visitors to a trail is desirable, so placing access and developing a suitable parking area off a heavily traveled road may be an advantage. However, for a conservation greenway, the opposite may be true.

Population and Socioeconomic Characteristics - The demographics of the immediate area and surrounding region will influence how the proposed trail or greenway is used. Elderly residents tend to use a trail for short excursions. Younger and athletically inclined individuals may use it less frequently, but for longer duration. The local planning department, economic development agency, or planning district commission will have statistics from the US Census Bureau and other sources to assist you in planning to meet the needs of the local population. An estimate of the potential demand, and potential economic benefits can be derived from studying socio-economic data from these sources.

Parks, Open Space, and Community Facilities Inventory - The locations and capacities of existing recreational facilities in the locality or region should be inventoried so that appropriate connections can be made and duplications can be avoided.

Potential Demand Analysis - A key factor that will influence greenway and trail corridor planning is the potential demand. If the region already attracts large numbers of recreational users, a hiking and biking trail may draw a significant number of visitors. In planning for the proposed trail, get attendance figures from similar facilities as a basis of future usage predictions. The Virginia Outdoors survey, or in some instances local demand surveys, may also be relevant and available to measure demand.

If the proposed trail is designed to be a recreation and tourist destination, other nearby tourist attractions may increase your draw as well. Local or regional tourism promotion organizations may be able to provide information about the numbers of visitors those attractions have and this may help you estimate potential demand for the site.

Trip generators are points of attraction that people will use the corridor to access. For example, there may be a playground, store, restaurant, or public library accessible to residents of a neighborhood by a path within the greenway. Also, a boat launch will generate trips, as will an exercise trail. Your planning team should make a map with potential trip generators and attempt to estimate the number of trips each could generate when the project is completed. Transportation planners and bicycle and pedestrian coordinators can assist in this area. The US Department of Transportation published a document titles *A Compendium of Available Bicycle and Pedestrian Trip Generation Data in the United States*, in 1994 (see Bibliography). This report contains a range of techniques that have been used to predict pedestrian and bicycle travel demand in different types of settings.

Potential Benefits Analysis - Greenway and trail planners think of potential economic benefits as tools to market their concepts. An economist can assist with assessing the potential benefits, which can be described in the master plan.

ECONOMIC BENEFITS

Increased real property values
Increase business revenues
Additional jobs created
Increased corporate relocation and retention

A section on estimated economic benefits appears in *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors* (see Bibliography). This publication of the National Park Service also cites dozens of studies showing economic and other benefits. The study gives rationales for and examples of how to use such models to make the general public and local officials aware of all benefits from protecting rivers and establishing trails and greenways.

Feasibility Determination - Your organization and any consultants involved will need to reach a conclusion about the feasibility of creating the greenway or trail. Refer back to the questions at the beginning of the chapter and discuss other concerns or constraints before writing the recommendation to pursue, delay, or terminate the project. Keep in mind that many barriers to feasibility may be overcome by further action of greenway and trail advocates. What is not feasible this year may become feasible in the future.

The Master Plan

Once the greenway or trail project has been deemed feasible, the information gathered in conducting the property research and the feasibility study will be used again in the master planning process. The variability of goals, resources, and terrain from project to project makes it impossible to give specific site plans for design and development in this manual. For more information, refer to manuals on trail design cited later in the chapter and listed in the bibliography. Keep in mind that the professionals creating the specific site plans will be able to advise you on the best construction options.

The master plan must specify what will be done, who will do it, how it will be paid for, and when it will be done. Questions to consider are listed in the table on the following page.

MASTER PLAN QUESTIONS

1. What will be the actual alignment of the corridor?
2. What alternative alignments are possible if problems are encountered?
3. Where will it begin and end?
4. Where will access points be provided?
5. How will access be controlled?
6. How will the trail or greenway be used.?
7. What amenities will be developed?
8. What kind of trail surface will meet the proposed usage and loads on the trail?
9. Will side-trails be used to connect to additional trip generators?
10. How will the rivers, railroads, and roads be crossed?
11. How will neighborsí privacy concerns be addressed?
12. Who will provide security?
13. Who will maintain the trail or greenway?
14. How will natural features be protected?
15. How will natural features be interpreted?
16. Which buildings and structures will be retained, improved, and used?
17. Where will acquisition funds come from?
18. Where will maintenance and operation funds come from?
19. Where will operational funds come from?

The master plan should not to be confused with the detailed site plan for your trail or greenway improvements. Professionals will develop site plans for specific improvements on your greenway or trail based on general decisions recorded in the master plan. The master plan can be created by any of the variety of consultants, including experienced trail managers, landscape architects, and engineers in cooperation with municipal officials. This is a particularly important tool to use to gain the support of these officials early on in the process, and to insure consistency with local and county comprehensive plans, local ordinances and code requirements. Researching these requirements during the design phase could avoid extra costs and delays in the project. Keep in mind that specific site plans may later be required for approval and permitting.

Goals and Objectives - The goals and objectives of the project are developed from the mission statement, as modified by input collected from the public, local officials, key contacts, professionals involved in the project, and partners.

Location Information - The location of the greenway or trail should be shown on a series of maps updated from the feasibility study mapping. One map should indicate a regional location of the project; a second should show the preferred corridor alignment in the community setting. If these maps are not at a scale useful to portray detailed locations of road crossings, access points, structures, and amenities, also include a series of map enlargements to illustrate these items. Descriptive text about the location of features should be included.

Summary of Outreach Results - The summary of citizen outreach results should focus on identifying the goals and needs addressed by the creation of a greenway or trail. It should list, in brief, the steps taken to reach

the public about your project, and, to the extent possible, should include data on the results of your outreach efforts.

Summary of Resource Inventories - The summary of resource inventories should focus on the features to be protected, interpreted, or otherwise affected by the development of the greenway or trail. The master plan can refer readers to the extensive data assembled for the feasibility study.

Development Plan - The development plan should consist of an item-by-item plan for each section of trail, access point, road crossing, bridge, picnic area, or other component of the greenway or trail. With information developed earlier in the process, your planning team can meet in an intensive design session to transform your visions into a plan. The charette, as these design sessions are often called, can focus on and produce such things as drawings of the site, construction specifications for the trail surface, design specifications of structures, and architectural concepts for buildings.

Implementation Timetable - Each element of the proposed project should be prioritized, and a timetable should be developed to accomplish each. The development of these elements may be grouped in phases. For example, all elements necessary to open the core of the trail to the public for minimum use should be completed in Phase I. Later phases can address the addition of amenities, extensions of the trail or greenway, and capital-intensive projects, such as historic site restoration.

Cost Estimates - Individuals with trail development experience should be consulted for general estimates of likely costs for the elements in the master plan, such as land acquisition, trails, parking, boardwalks, fencing, utilities, security, lighting, etc. This will provide guidance for any fundraising efforts. Although the cost of these projects may seem overwhelming, keep in mind that creation of linear parks, trails and greenways often is less expensive than creating other types of recreational facilities. Cost estimates for a specific project are best developed by averaging actual costs from a variety of similar projects recently completed in the immediate vicinity of the proposed project. For general guidance, cost estimating data derived from recent trail and recreation projects in Virginia is in Appendix IX.

Management Plan - The management plan outlines all aspects of operations and maintenance and addresses administrative work, promotional activities, security patrols, refuse removal, and educational interpretation, as well as routine and deferred maintenance. The management plan should be detailed enough for use in preparing an annual operating budget. It should also specify which entities will be responsible for each action item.

Presenting the Master Plan to the Public

When a final draft is completed, request that your elected officials present the master plan to the community in a public meeting. This is an important step in solidifying public support. A transcript of the public comments should be attached to the final plan. After the plan has been fine-tuned and is in keeping with the input of local officials, ask that the plan be adopted or approved by the local governing body.

Identifying Needed Facilities and Infrastructure

The master plan should identify what structures, improvements, and amenities needed to meet the stated community goals for the project. Structures might include gates, barriers, culverts, bridges, parking areas,

or boat launches. Amenities could include an information kiosk, comfort station, visitor center, picnic area, or outdoor study areas. Specifications for the design of these items should be included. For example, in designing a parking lot, determine its location, estimate the size and capacity, and specify amenities, such as lighting and gates. Sample or standard designs are available for certain common elements of greenway and trail design. *Greenways, A Guide to Planning, Design, and Development* (see Bibliography) illustrates sample sketches and photographs for a variety of designs. *Trails for the 21st Century* by the Rails to Trails Conservancy is also a useful resource.

The design theme articulated by the master plan should be consistent with community character and the intended uses of the trail. Trail surface is a primary design consideration that will be dictated by intended use. For example, pavement is likely to be damaged by the carbide studs on the tracks of snowmobiles, while wood chips or river stone will not accommodate most wheeled vehicles. These conflicts must be addressed at the design level in your master plan. The National Bicycle and Pedestrian Clearing House has a technical brief on resolving trail user conflicts (see Bibliography).

Community character and aesthetic values desired to be maintained for a greenway or trail must be taken into consideration in design decisions. For instance, lighting an urban greenway's path with Victorian-era gas lamps may be in keeping with the surrounding business district, whereas a rustic picnic table would look out of place. Funding agencies may have standards, requirements, or conditions that must be met. It is advisable to check with each funding source early in the master planning process.

Enhancing Economic Benefits

Evidence shows that greenways and trails provide economic benefits to the communities in which they are located. These benefits may be enhanced by incorporating economic activity into the greenway or trail or by linking to sites where economic activities take place. Through the master planning process, the committee can use economic impact information previously developed during the feasibility study and present that data to the business community to encourage collateral development.

National research indicates that nearby collateral services such as food, lodging, transportation, supplies, and entertainment attract people to visit nature areas or trails, and encourage them to stay longer. Visitors support the greenway or trail directly by making a donation, paying a user fee, or purchasing a promotional item. The local economy is benefited by their purchasing equipment, lodging, food, and services. Examples, are provided in the publication, *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors* (see Bibliography).

Designing for Successful Collateral Development - Collateral development means connecting your greenway or trail to off-site amenities and attractions. The master plan should identify uses and services compatible with the intent of the proposed project. It may be possible to locate larger trailheads close to existing shopping centers or clusters of services.

Once plans for a greenway or trail are announced, entrepreneurs may express interest in opening businesses. To support your greenway or trail, the planning team should consider leasing structures in the corridor to entrepreneurs. For example, a house on

farmland acquired for a greenway could become a bed and breakfast or a youth hostel; or a large room in a trail visitor center could be leased to a cafe operator. In such an arrangement, the organization should receive a percentage of net profits from sales generated by the concessionaire.

Livery service is another example of collateral development. Businesses may be permitted to drop off and pick up clients at the trailheads. Where rails-with-trails exist, the train operator may set up a shuttle service. If the trail corridor is longer than a day's journey by foot, bike, or boat, you could actively seek development of campgrounds.

Your organization should consider working with local businesses on promotional projects that will benefit both the project and area businesses. Examples include a map of the proposed trail or greenway printed on placemats at local restaurants, or a brochure, sponsored by local businesses with their listings on the printed material.

Guidebooks provide another opportunity for a cooperative endeavor. Information provided in guidebooks encourages trail use as potential visitors want to know about the trail or greenway before deciding to visit. A private company may produce a guidebook to the proposed trail and offer it for sale through your organization or local merchants.

4. Acquisition and Development

One of the most challenging phases of establishing a greenway or trail will be the acquisition of the right-of-way (ROW). Proponents should brace themselves for when apparent supporters of the plan balk at signing a deed or easement. If they have been involved in the planning, they will most likely eventually sign. But there may be property owners who won't; often those will have maintained a distance from the process and avoided appearing too enthusiastic when approached. The greatest reward for organizers will be the owner who, having at first been skeptical, becomes a vocal supporter and donating participant.

The objective is to acquire titles, leases, easements, and/or access agreements to the land area covered by the greenway or trail. This step will involve considerable negotiation and working with owners, attorneys, and local government officials. Those greenway or trail organization members who undertake this process will need to know, or become familiar, with real estate law

and land recording procedures. At numerous points in the process, and possibly on a continual basis, the organization will likely need to engage the services of an attorney experienced in real estate transactions. The legal instruments necessaryfor acquisition of property rights can be legally created by individuals for their own property, but experience is required to keep the process moving. In some cases, property owners may relieve the organization of the legal burden of document production by having their own attorney prepare them, but even then it is a good idea to have counsel available to review what is offered.

Legal Instruments for Acquisition of Rights-of-Way

There are several legal instruments that may be used to transfer ownership of property or interests in property. They may be temporary and have specific termination clauses, as with a lease or access agreement, or they may convey permanent rights to the land, as do conservation easements and fee simple title. The most important instruments are listed here and described briefly below:

Titles include warrants, deeds, and quitclaim deeds, and confer all rights to a property except certain rights, such as mineral rights or rights-of-way across the property. Titles to land are usually acquired "in fee simple", through contribution or outright sale.

When your greenway or trail organization acquires title, name a reliable and well-managed land trust or conservancy to hold reversion rights and be the "heirs" should your organization disband at some future date. This will continue the protection of the corridor.

Easements are legal documents conveying ownership and control of a certain interest, right, or tangible element of a property to a second party, while the owner retains other rights to the land. In a conservation easement, the owner sells the rights to develop the land to a land trust or conservancy while retaining the right to continue living on the land. In an agricultural preservation easement, a farmer sells all land use rights except farming to assure that future owners of the land are bound by the constraint.

In general, a greenway organization will attempt to acquire conservation easements that prohibit development and certain other land use practices across all or part of a property. A trail organization will seek to purchase a ROW, perhaps owned by a railroad or utility company, to use as a trail corridor or may seek to obtain an easement creating a new ROW.

Access and use agreements between a land owner and a greenway or trail operator specify how a portion of a property may be used. A landowner, for instance, may permit a hiking trail to be developed on his or her property but continue to use the property for forestry or farming. The agreement should contain a termination clause that may specify automatic termination on some date, termination if the landowner sells the property, or termination for other cause. It can detail obligations the greenway and trail group takes on, such as liter removal, security patrol, and trail maintenance. The agreement may also limit use to certain seasons, such as winter only. It should also note accepted and expressly forbidden activities.

A landowner who opens his or her land for recreational use, without charging a fee is protected from liability by Virginia Code 29.1-509 and supporting case law. The landowner may also be indemnified under a greenway or trail organization's insurance program.

Leases convey almost all rights, control and liability for a property to the lessee for a specified number of years and may provide the landowner with compensation from the lease. Leases are usually long-term, with 25 years and 99 years being typical durations, although perpetual leases are preferred. There are creative ways leases can be used; for example, a farmer can sell his or her property to a greenway group, but lease back the rights to continue farming. A number of farms operate this way in the Appalachian Trail Corridor.

Acquisition Procedures

The procedural steps commonly involved in transactions related to greenways and trail rights-of-way are similar to those that occur when real property, such as a residence, is purchased.

Identification of the land parcels needed for the greenway can be accomplished based on the general alignment of the area to be preserved. For a trail, particularly where the ROW may be restricted to little more than the actual width of the tread, the design of the facility must be worked out in greater detail. For a water trail, individual sites needed for access, rest areas, and camping are normally limited in size and separated by distance. In any case, the tax maps and records of the local government having jurisdiction over the property must be consulted. If this information was not collected in the master planning phase of the project, it must be done so now. This task can be time consuming and will be difficult for anyone not familiar with gathering real property information. When the exact boundary of the area needed is known, the individual parcels affected can be identified by locating the boundary relative to roads and significant streams. The tax maps show the boundary of all parcels for which deeds have been recorded and indicate the parcel number for each. The researcher must collect these tax map and parcel numbers for each parcel that will be affected, both by the actual facility to be created and by construction or access for construction or maintenance. The tax assessor's office will be able to provide the name and address of the person who owns each parcel and the address of where the tax bill is mailed.

The next step is for the researcher to go to the local court records clerk's office and find the latest recorded deed for each property. Those deeds will include the owner(s) names, and the legal description of the property boundary. There may be references to easements that are already in-force on the property. In some cases, the deed may include a survey map, or plat, indicating boundary data (boundary lines, lengths, and compass bearings), structures, and existing easements. If there is no plat, the boundary can be approximated by comparing the tax map and the property description. When this information is overlaid on the greenway or trail plan, a picture develops of how much land from each parcel is needed.

When the exact portion of land has been identified for a section of the greenway or trail, a drawing of each should be prepared. The drawing should show the area of the parcel near the proposed easement and any structures or improvements nearby. Boundary lines, lengths, and bearings should be shown so that the parcel map resembles a plat. The area proposed to be transferred or covered by an easement should be shaded and marked with dimensions and angles as needed to clearly illustrate what land is intended for discussion.

An appraisal of the value of the area of land, and any improvements, must be completed before conclusive discussions with a land owner can proceed. If the needed land is completely visible from a public road or other property, the land owner may not need to be contacted

in advance. The appraisal can be completed based on observations made from the public area, without the assessor entering the property. If the land is not visible or accessible, the land owner must grant permission for the appraiser to enter the property. In such cases, it is best if the proposed greenway or trail plan has had adequate prior public exposure. If it has not achieved wide public acceptance, or at least exposure, proponents will have to explain the whole idea to each land owner individually. It is much more efficient to inform the landowners as a group. You will ultimately have to negotiate with each of them separately for final agreements and documents, but group meetings in the early stages of acquisition can limit the time spent explaining the project to individuals.

Assuming that access for appraisals is available, they should be contracted for as a group. Specifications should be prepared and the package distributed to appraisers in accordance with local, state, or federal procurement regulations, depending on the origin of funding for acquisition. The appraisals identify the fair market value of the land or easement to be purchased or donated. The map and appraisal for each parcel forms the package with which you approach the landowners with a proposal of purchase or donation. Because this work has been completed simultaneously for an entire section of greenway or trail, the owners will be reassured that it is fair and consistent.

Acquisition offers can now be made to individual property owners. Assuming that they all know about the proposed greenway or trail, they will have formulated ideas about the project and how it might affect them. Most will have made their opinions known, but some will reserve their ideas until approached individually, in private. If these negotiations can be completed, or guided, by an experienced individual, it may expedite the process. Because every property owner's situation is different there are likely to be a variety of questions that arise. If they can be authoritatively answered when asked, the negotiation can proceed efficiently. Even with experienced negotiators, this process may involve more than one visit with each property owner before they actually sign the documents.

Transfer documentation, normally consisting of titles and easements, as described above, will be created to put the final agreements into the proper legal form for recording with the local clerk of the court. As with the documentation required for the purchase of a home, these papers must be presented in a form acceptable to the local authorities under state and federal code. The normal way to ensure that these materials are correctly prepared is to have them completed or checked by an attorney or title insurance closing agent familiar with the local procedures. The final papers are then signed and funds are transferred at the formal closing of the transaction.

Recording occurs after the closing when the signed papers are filed with the local clerk of the court. The transaction becomes official when the clerk processes the papers and places them in the official deed books of the locality, The clerk designates the specific date of the transaction, which is usually the day the papers are received, or very soon thereafter.

Design and Development of Facilities

When the greenway or trail ROW has been acquired, the process of designing the planned improvements for the property can proceed to final stages. Improvements to a greenway could be limited to installing signs, but may involve more elaborate activities, such as habitat restoration. Because development of a trail involves

construction of facilities and installation of equipment, the paragraphs below provide advice on implementation procedures and recommendations for common features, materials, and equipment.

Establishing a phasing plan is the first step in breaking the total project down to fit the funds committed to the project. To develop a phasing plan, fairly accurate costs for proposed improvements must be determined. While general costs and quantities were sufficient to determine feasibility, develop the master plan, and apply for grants, greater accuracy and detail will be needed at this point to ensure that a usable facility is available when construction funds have been expended.

Those who work in the construction industry have methods and data that can help identify probable costs of materials and labor for various types of improvements, but considerable experience and judgment is needed to make accurate interpretations.

Ways to reduce construction costs

1. **Seek donated materials from suppliers in exchange for recognition.**
2. **Use recycled or surplus materials from contractors in the area.**
3. **Use waste materials, such as wood chips, fly ash, and demolition debris.**
4. **Well organized volunteers can provide labor for some tasks.**
5. **Involve scout and other youth groups.**
6. **Community service ordered by the courts may be applicable to a trail project.**
7. **Contractors may donate equipment and expertise.**
8. **Inmate labor from area correctional units.**
9. **Youth Conservation Corps.**

Your organization can engage the services of professionals familiar with estimating construction, or you can develop your own estimates based on contacting other trail groups which have had recent construction experience in your area. Some cost data that can be used for general guidance is included in Appendix IX. The most time-consuming method of predicting costs is to contact three contractors or suppliers for each step of the construction process (e.g. grading, paving, signs) to get a feel for how they price their work or deliveries.

With current prices for the various items and the master plan, you can calculate the total cost for each item for a convenient increment of the trail, such as per foot or per 100 feet. Based on the combined unit costs for all of the elements to be included you can work out how much of the trail can be built with the available funds. These unit prices can also be used for fundraising. The organization can "sell" segments of the trail to donors who receive recognition for the segment through a sign or plaque. Care must be taken to include everything that will be required. If, when planning for the trail, contractors and suppliers have agreed to donate services and materials, those items can be omitted from these estimates. When the probable cost has been estimated for a usable segment of the trail, the phasing plan can be completed to show the sequencing, timing, and budgets for the first and subsequent segments.

Construction plans and specifications can be prepared next, using the funding immediately available for implementation. Using unit prices from the phasing plan and the list of improvements to be made, drawings can be prepared that show the length, width, and elevations of the trail and the specific locations, sizes, and quality of all the materials and equipment. These detailed drawings and specifications can be distributed to interested general contractors for competitive bidding.

If funding for the project comes from state or federal sources, the funding agency will supply the specific requirements for procedures to be followed in bidding. If the local government is involved in the project, personnel from the public works or purchasing departments will likely be involved to assist with the bidding process. If funding is all from private sources, the procedures are less prescribed and more like the course of action an individual would take when seeking a contractor for improving private property.

Construction permits will be required before building most significant elements such as parking lots, entrance driveways, drainage structures, and maybe even signs and the trail itself. What is required will be determined by the local government with jurisdiction over the real estate involved. If streams or wetlands are to be crossed or disturbed in anyway, state and federal agencies must be contacted to determine what permit applications will be required, in addition to those submitted to the local government. Normally, a complete set of plans and specifications include temporary measures and permanent fixtures needed to mitigate the effects of construction and long-term use of the facility. Erosion and sediment control and traffic control plans prescribe specific actions that must be performed during construction. With those plans, the contractor will apply to the local government for a grading permit and permission to interrupt traffic when needed. Plans for detaining and treating stormwater runoff leaving parking lots and paved surfaces will be required in all Tidewater localities and other localities which have implemented stormwater management regulations under the Chesapeake Bay Act and/or the federal Clean Water Act. A local building permit may also be required for some or all of the work and the contractor will use the plans to apply for the permit.

State and federal permits may be required for alterations to streams, wetlands, or beaches. Because the measures needed to protect these resources are site specific, there are few standard solutions that can be included in the contractors' bid materials. Therefore, an application must be submitted to the relevant agencies during the development of the plans and specifications so that the measures that will be required can be included in the work. If a project comes in contact with any body of water, other than a very small privately owned pond, the Virginia Marine Resources Commission should be contacted to initiate the Joint Permit Application process. This process will inform the appropriate regulatory agencies of the project and they will determine whether they have jurisdiction over the proposal. With the Joint Permit Application, you will need to include fairly detailed plans of your proposed construction and any mitigation measures proposed. Representatives from one or more state or federal agencies may need to visit the site prior to making a jurisdictional determination.

Inspection of construction provides quality control over the final product. An individual familiar with the intent and specifics of the project should observe the work of contractors on a frequent and regular schedule. Deviations from the plans and specifications should be brought to the attention of the general contractor. One individual should be designated as the construction representative of the trail organization so the general contractor has a ready point of contact. It is essential that contractor questions be answered quickly and with certainty, and that unacceptable deviations from the plans and specifications be corrected.

Payments to the general contractor should be made promptly, but only for work completed minus approximately 10 per cent of each bill submitted. The

amounts held back, called retainage, are reserved until the final inspection has confirmed that all work is finished in a satisfactory manner. A letter of acceptance from the organization should be provided to the general contractor along with payment of the retainage.

Trail Design Standards

Design details of trails that are funded by state or federal transportation programs must be approved by those agencies. Therefore adherence to their current standards and procedures streamlines the approval process. It helps to consult the local public works department or the VDOT District Engineer early in the design process so that plans are prepared appropriately for review. Also, ask for the review process timetables so that you can accurately schedule advertising for bids.

Sources of Information on Trail Design

VDOT, and some localities, publish standards and specifications for roadway improvements, which include bike lanes and a range of other structures and improvements, such as culverts, that are useful for trail design. Any trail that is constructed within the ROW of a public street or road must conform to the applicable standards. The American Association of State Highway and Transportation Officials (AASHTO), a source used by VDOT in developing state standards, publishes a *Guide for Development of Bicycle Facilities* that includes parameters for width, clearance, radius of curves, and even the friction values for different surfacing materials. For mountain bike trail design standards, designers should contact the International Mountain Bicycle Association, which is in the final stages of developing standards. For foot path design specifications and methods, see *Trail Design, Construction, and Maintenance* by the Appalachian Trail Conference (ATC). The Rails-to-Trails Conservancy's *Trails for the Twenty-Fist Century* contains a wealth of design information, and *How Greenways Work*, published by the Rivers, Trails, and Conservation Assistance Program of the National Park Service, contains design information applicable to greenways.

Water Trail Design

1) **Provide access points at fairly frequent intervals (5 miles for rivers).**
2) **Provide adequate parking to meet demand. Hand carry launches should be hardened as well as boat ramps. Boat slides do well where banks are steep.**
3) **Have information kiosks and brochures at each access which orient users to the trail, and contain a map describing public use areas, sanitation stations, emergency telephone numbers and locations of telephones, camp sites, rules and regulations.**
4) **A ìleave no traceî philosophy of use should be advocated in the literature and on information kiosks.**
5) **Camp sites should be hardened in heavy use areas. Most campsites should not be accessible to vehicles except for administrative access.**
6) **Riparian areas should be protected and maintained as functioning buffers.**
7) **A ëno open camp fireí policy should be enforced.**
8) **Public lands should be clearly identified from the river.**
9) **Mile markers should be posted along the river and tied to the map in the brochure.**
10) **Prohibitions against trespass on private land should be clearly stated in informational literature.**
11) **Some group camping areas should be developed for scouts and other group use.**
12) **Provide sanitation facilities at public access points and periodically along trail. (5 miles)**

For water trails, see *Modern Water Trails, Second Edition*, a publication of North American Water Trails, Inc. (see Bibliography). Water trails have some requirements that differ from overland trails. Some water trail design criteria are listed on the following table.

Various publications and technical manuals include specific data and design criteria related to the alignment, materials, and finishing of trails, bike paths, and other pedestrian and motorized facilities. In addition, there are sources of information on construction practices and mitigation measures appropriate for developing recreation facilities in sensitive environments. Some local governments publish their own standards and practices, and others refer to state manuals of standards as the authority for what would be required for local permits to be issued.

For any trail, there will be a set of conditions that must be resolved by its design. This handbook can not outline all of the criteria for all types of trails, but does include sample criteria that relate to a universally accessible pedestrian trail design. This information will serve to define the parameters of a type of trail that would be widely developed, and to demonstrate the significance that various environmental and construction factors have for the design of other specific types of trails.

The balance of this section is taken from the *Trail Development and Management Standard Operating Procedures Manual* developed by DCR, Division of State Parks.

New Trail Construction

Basic Construction Standards

Once the trail is marked and approved, construction can begin. This section addresses basic construction standards, beginning with the clearing of trees, brush, and rocks, then establishing the trail foundation and basic trail tread, and continuing into standard methods for surface water control, wet area crossings, and water crossings. Special structures such as switchbacks, cribwalls and steps are included, as well as support structures such as overlooks and kiosks. Specific types of trail construction techniques relevant to specific trails, such as mountain bike trails or equestrian trails, are presented in the following section, titled Specific Trail Types.

Creating the Trail Corridor

The trail corridor is a zone that includes the trail tread and the area above and to the sides of it. For the purpose of this manual, the edges of the corridor are considered the "clearing limits." Vegetation and other obstacles,

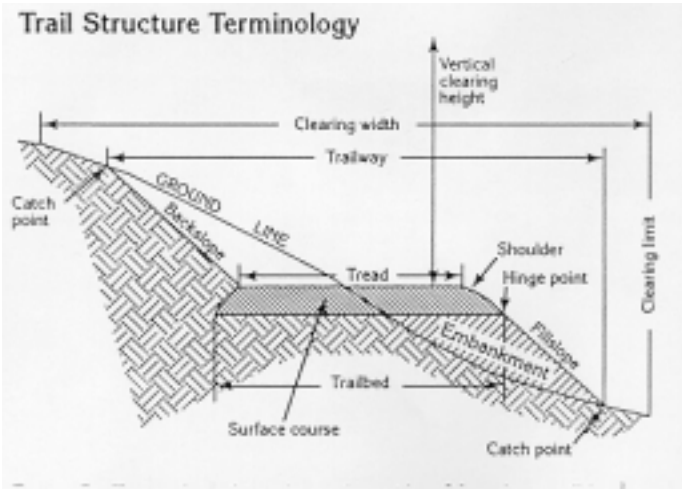


Figure 4-1:
Trail Structure Terminology
[Trail Construction & Maintenance Notebook, USFS, p 17]

such as boulders, are trimmed back or removed from this area to make it possible to ride or walk the tread. (Note that common references to the Appalachian Trail "corridor" typically extends beyond the cleared limits.)

The dimensions of the corridor are determined by the needs of the target user and the desired trail difficulty level. For example, trail corridors for a recreational biking trail are cleared 8- 12 feet wide (4 feet for single lane tread or 8 feet for double lane tread, and 2 feet beyond the tread each side) and 8 feet high. Hiking trails are cleared 6 - 9 feet wide (2 feet for single lane tread or 5 feet for double lane tread, and 2 feet beyond the tread each side) and 8 feet high. Check the specific trail type dimensions in the following section titled Specific Trail Types.

Clearing and Brushing-No sooner is a trail corridor cleared of plants than they begin to rush toward this new avenue of sunlight. A significant threat to trail integrity comes from plants growing into trail corridors, or falling across them. Brush is a major culprit. Other encroaching plants such as thistles or dense ferns may make travel unpleasant or even completely hide the trail. If people have trouble traveling your tread, they'll move over, usually along the lower edge, or make their own "volunteer" trail.

In level terrain the corridor is cleared an equal distance on either side of the tread centerline. Using the hiking trail example, this means that the corridor is cleared for a distance of 2-1/2 feet of the center. Within 1 foot of the edge of the tread, plant material and debris should be cleared all the way to the ground. Farther than 1-1/2 feet from the trail edge, plants do not need to be cleared unless they are taller than 1-1/2 feet or so. Fallen logs usually are removed to the clearing limit.

On moderate to steep slopes, a different strategy is often useful. Travel along the lower (outer) edge of the tread is a significant cause of tread failure. Trail side material can be used to help hold traffic to the center of the tread. A downed log cut nearly flush with the downhill edge of the trail will encourage travelers to move up to avoid it. Rocks, limbed trees, and the like can all be left near the lower edge of the tread to guide traffic back to the center. However, be sure that material along the lower edge of the tread does not cause water to run along the trail instead of draining off.

On the uphill side of the trail, cut and remove material for a greater distance from the centerline. For instance, on slopes steeper than 50 percent you may want to cut downed logs or protruding branches 6-1/ 2 feet horizontal distance or more from the centerline. This is particularly true for equestrian trails as horses tend to shy away from objects at the level of their heads.

Remember that the "scorched earth" look created by a corridor with straight edges is not very pleasing to the eye. Work with natural vegetation patterns to "feather" or meander the edges of the clearing work so they don't have such a severe appearance. Cut intruding brush back at the base of the plant rather than in midair at the clearing limit boundary. Cut all plant stems close to the ground. Scatter the resulting debris as far as practical on the downhill side. Toss stems and branches so the end lies away from the trail (they'll sail farther through the brush as well). This minimizes the obvious visual impact of trail clearing efforts. Don't windrow the debris unless burning or other removal can occur. Rubbing the cut ends of logs or stumps with the soil will reduce the brightness of a fresh saw cut.

Removing Trees-Trees growing within the corridor should usually be removed. Remember that those cute

little seedlings will eventually grow into pack-snagging adolescent trees. They are a lot easier to pull up by the roots when they are small than they are to lop when they grow up.

Prune limbs close to the tree trunk. For a clean cut, make a shallow undercut first, then follow with the top cut. This prevents the limb from peeling bark off the tree as it falls. Do not use an ax for pruning.

If over half of the tree needs pruning, it is usually better to cut it down instead. Cut trees off at ground level and do not leave pointed stobs. Felling standing trees (including snags) is statistically one of the most dangerous activities a trail worker can engage in. Simply put, do not even consider felling trees unless you have been formally trained and certified by the Site Safety Officer. Be sure to fill and tightly pack the soil in holes left from stumps.

When removing down logs from the trail, cut the log out as wide as your normal clearing limits on the uphill side, and out of the "clearing zone" but close to the trail on the downhill side. Roll the log pieces off the trail and outside of the clearing limits, on the downhill side. Be sure to keep ditches or waterbar outflows free.

Removing Roots and Stumps-Removing roots and stumps is hard work. Stump grinders are good alternatives for removing stumps, but chances are you will have to do the work by hand. A sharpened pick mattock or pulaski is most often used to chop away at the roots. If you are relying on some type of winch system to help you pull out the stump, be sure to leave the stumps high enough (2 - 3 feet above ground level) to give you something to latch onto for leverage.

Not all roots and stumps are problems. You should not have to remove many large stumps from an existing trail. Before you do so, consider whether a stump was left the last time around to help keep the trail from creeping downhill. Rule of thumb for roots - if perpendicular to the tread, fairly flush, and not a tripping hazard, leave them. Remove roots that are parallel with the tread. They cause erosion and create slipping hazards. Look for the problem that exposed the root and fix that problem.

Removing Rocks-Rock work ranges from shoveling cobble to blasting solid rock. Both ends of the spectrum are often speciality work. Blasting can save a crew an astounding amount of work, but can only be conducted by a trained, certified blaster. The key to any decent rock work is good planning and finely honed skills. Other solutions to large rocks include ramping the trail over them, or rerouting the trail around them.

The secret to moving large rocks is to think first. Plan out where the rock should go, and anticipate how it might roll. Be patient - moving rock in a hurry almost always results in the rock ending up in the wrong location. Communicate with the crew about how the task is progressing and what move should occur next. Be careful to avoid opportunities for loosened rocks to careen down a slope, out of control. Damage to people, as well as the trail, can occur. If there is a possibility of people below, close the trail or area until the rock removal is complete.

Two of the most common injuries in rock work are pinched fingers and strained backs. When dealing with rocks, work smarter, not harder. Skidding rocks is easiest. Rolling them is sometimes necessary. Lifting rocks is the last resort. When you need to lift rocks, be sure to keep your back straight and to lift with the strong

muscles of your legs. Sharing the burden with another person is sometimes a good idea.

Rocks should be removed to a depth of at least 4 inches below the tread surface. Simply knocking off the top flush with the existing tread may mean a future obstacle as erosion removes soil from around the rock.

Small stones are often needed for fill material behind crib walls, in turnpikes and cribbed staircases, and in voids in talus sections of trail. Buckets, canvas carrying bags, and wheelbarrows are handy for transporting this fill material. If you are part of a large crew, handing rocks person-to-person often works well. In some areas, much of the tread will be made up of rocks that are shifted from their original position and laid in place to develop the desired slope.

For additional details on moving and using rocks, see *Lightly on the Land* by Robert Birkby.

Trail Foundation

Trailbed-The existing trail surface should not be unnecessarily disturbed to obtain a trail base, especially on flat areas. On level ground, the trail base should be formed by building up rather than cutting down. All duff should be removed before making cuts or fills for the tread.

Hillside Trails-Construction of hillside trails usually requires grading a shelf for the trail, but if the existing surface is flat and provides a suitable tread, it should be left undisturbed. Hillside excavation may not be necessary on slopes less than 10 percent. On hillside trails, the trail bed is excavated into the side of the hill to provide a slightly outsloped travel path. Depending on the slope of the hill, the amount of excavation and the use of the excavated material will vary.

On steep slopes, **full-bench construction** is usually needed. Soil excavated from the hill is cast as far as possible from the trail and not used at all in the fillslope. Especially on steep slopes, relying on fill for part of the trailbed is a bad idea. This soft material is likely to erode away quickly, creating dangerous soft spots on the downhill edge of the trail. If fill is used, it often needs to be reinforced with expensive crib or retaining walls. As the slope of the hillside decreases, it becomes more feasible to use fill material as part of the trailbed. However, even though it requires more hillside excavation, full-bench trailbeds will generally be more durable and require less maintenance than partial bench construction. There is a tradeoff, though. Full-bench construction is often more costly because more excavation is needed, and it also results in a larger

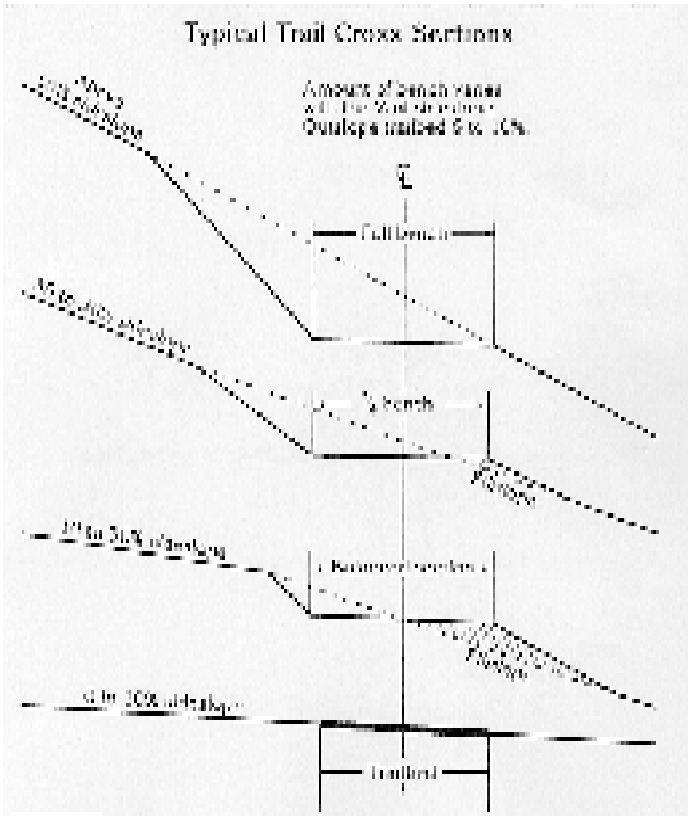


Figure 4-2 : Typical Trail Cross Sections-full bench, partial bench, balanced bench

[Trail Construction & Maintenance Notebook, USFS, p.25]

backslope. Most trail professionals will usually prefer full-bench construction.

The **backslope** is the excavated, exposed area of the trailway above the tread surface. Backslopes range from near vertical (in rock) to 1:2 in soils having little cohesion. Backslopes cannot be steeper than the exposed material's ability to stay put during typical climatic conditions. If backslopes exceed this limit, usually after a period of wet weather, the slope usually fails, blocking the tread.

A second option is to construct a crib wall and use the fill to support the entire tread surface. This can be less obtrusive than huge backslope excavations and more stable, if the wall is well constructed. Much less backslope, if any, may be needed.

The **fillslope** is that area of the trail below (downslope from) the tread surface. A full-bench tread, of course, will not have any fill associated with this side of the trail. Fillslopes are critical. If you take care of the downhill side of the trailway, you will avoid the vast majority of problems associated with trail maintenance. See figure 4-2.

The **slope**, or the percent of grade, is the relationship between the horizontal distance and the vertical gain. It is a way to describe and determine the steepness of hillsides, trail tread, backslope and downslope. Slopes are often described as percents, but may be described as a ratio of vertical to horizontal, or "rise" to "run" (rise:run). For slopes flatter than 1:1, express the slope as a ratio of one unit vertical to the number of horizontal units. For slopes steeper than 1:1, express the slope as the ratio of the number of vertical units to one unit horizontal.

Percent of grade may be expressed as the following equation:

Percent of grade = rise/run

Rise is equal to the vertical gain, and run equals the horizontal distance over which the rise occurs.

The grade of a trail rising at a rate of 4 feet for each 100 feet of horizontal distance would have a prevailing grade of 4 percent. It would be calculated as follows:
percent of grade = 4 feet (rise)/100 feet (run)

See Appendix XVIII for additional information on calculating and laying out grade.

Often you will need fill material. The hole you dig is called a **borrow pit.** It should be screened from view. The material in the pit also needs to be suitable for the desired use. Good choices are soils with a balanced mixture of different size particles. Sand and gravel work well. So do small, well-graded angular rocks.

Compare existing trail tread materials with borrow sources. Consider the proportions of gravel, sand, and fines. Individual "fine" particles are not visible to the naked eye and are classified as silt or clay. If the proportions of gravel, sand, and fines are similar, you can expect the borrow materials to perform as well as the existing trail tread materials. If the borrow source has a smaller proportion of fines, you can expect better performance under wet conditions.

Soils from bogs are not suitable for tread fill because they lose strength when they become wet. These dark organic soils are identified by musty odor when damp. Creek bottoms that are replenished by storms and

seasonal water flow, and the base of cliffs where heavyrunoff or gravity deposit sand and gravel, are good places to look. Don't destroy aquatic or riparian habitat with your pit.

Save all your squares of vegetation removed from the top of the pit. Youll need them for restoration. Place them in the shade and keep them moist by covering them with wet burlap. To rehabilitate, grade the pit out to natural contours with topsoil and debris, then revegetate. Camouflage the area and access trails with boulders and dead wood.

The following steps describes how to build a sidehill trail, once the vegetation has been cleared:

1) Mark the centerline of the trail with wire flags no more than 10 feet apart. These wire flags are the key to explaining how to dig the tread, and they keep the diggers on course.

2) Remove leaf litter, duff, and humus down to mineral soil. To mark the area to be cleared, straddle the flag facing the uphill slope. Swing your Pulaski or other tool. Where the tool strikes the ground is approximately the upper edge of the cut bank. The steeper the slope, the higher the cut bank. Do this at each centerline flag, then scratch a line between them. This defines the area to be raked to mineral soil. Clear about the same distance below the flag. Remove the duff. Don't clear more trail than can be dug in a single day unless you know it is not going to rain before you can complete the segment.

3) For a balanced bench trail, the point where the wire flag enters the ground is finished grade. Scratch a line between flags to keep you on course. Facing the uphill slope, begin digging about 6 inches from the flag cutting back into the slope. Imagine a level line drawn from the base of the flag into the bank. Dig into the bank down to this line, but not below. Pull the excavated material to the outer edge. Tamp this fill material as you go. On a full-bench trail, the wire flag essentially ends up at the outside edge of the trail. For less than a full-bench trail, the flag ends up somewhere between the centerline and the outside edge. Keep this in mind when you place the wire flags.

4) There is a tendency to want to stay facing uphill. To properly shape the tread, you need to stand on the trail and work the tread parallel to the trail direction to level out the toe of the cut slope and to get the right outslope.

5) There is a tendency to make the trail too narrow. If the width of rough tread equals the length of a Pulaski handle, the narrower finished tread will be about right for a good hiking trail.

6) Make sure grade dips and other drainage structures are flagged and constructed as you go.

7) If you try to slope the cut bank close to the original surface, you will usually get somewhere close to what is needed. Slope ratios are hard to understand. Instead, look at the natural slope and try to match it.

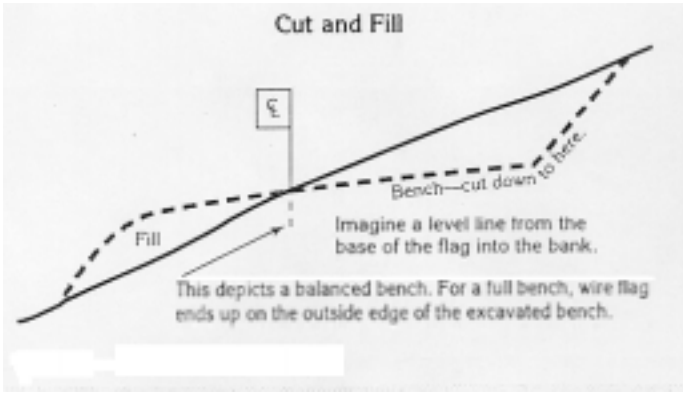


Figure 4-3: Basic Sidehill Trail Building
[Trail Construction & Maintenance Notebook, USFS, p. 26]

8) Round off the top of the cut slope. The easiest way to do this is to rake parallel to the cut edge with a fire rake.

9) The best way to check the outslope is to walk the tread. If you can feel your ankles rolling downhill, there is too much outslope. The outslope should be barely detectable to the eye. If you can see a lot of outslope, it's probably too much. A partially filled water bottle makes a good level. Keep in mind that compaction from use will make the outslope greaer.

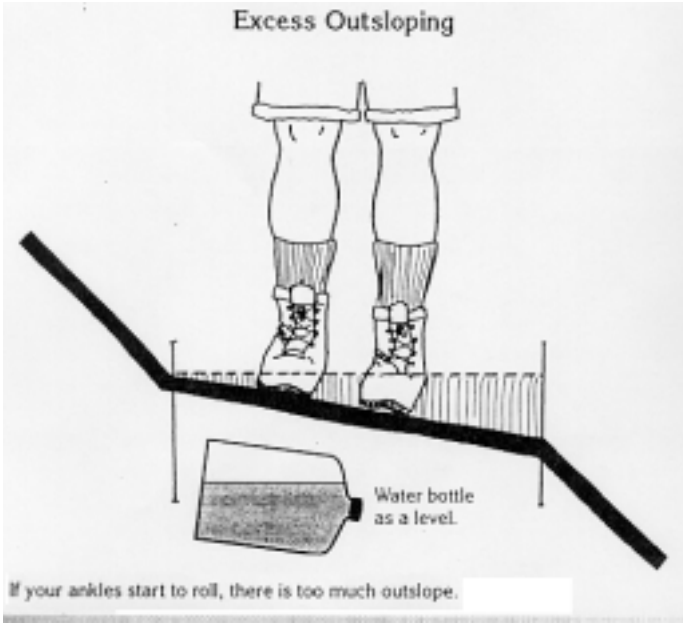


Figure 4-4: Excess Outsloping
[Trail Construction & Maintenance Notebook, USFS, p. 27]

Flat land trails-A flat land trail is a trail where the cross slope is less than 10 percent.

A **crowned tread** detail is used on flat areas where cross slopes are less than 10 percent, and occasionally up to 20 percent. The crown shall be 3 inches high, minimum. The objective is to construct a trail and provide for proper drainage when the slope does not take care of the drainage on its own. Crowning the trail creates a trench on the uphill and downhill side of the tread. Only one trench may be required in some cases. The uphill trench may need to cross the trail with a structure such as a cobble drain. Locate the crowned trail so that remaining vegetation keeps people on the trail. The trail surface must be well compacted.

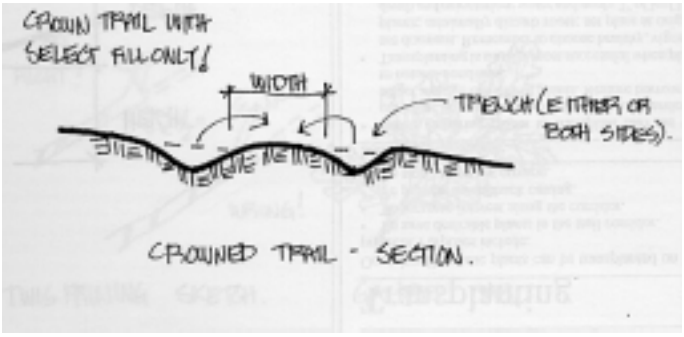


Figure 4-5: Crowned Trail
[Mountain Trails Management, NPS, p. G-8]

The **tread cut with ditch** is used in flat areas and other areas of less than 20 percent slope where drainage is impeded on the downhill side (puddling). The trail tread is cut through sod or the litter layer and an appropriate size trench on the downhill side is cut. Dispose properly of all material removed (downhill). Cross drains may still be required, even with a ditch. Remember to outslope trail and smoothly grade the ditch to expedite revegetation. While this technique is an option to solve a "puddling" problem, it has greater impact on the trail environment and requires more maintenance than a trail avoiding such an area altogether.

A **through tread cut** is used where topography does not allow typical tread cut construction. Typical tread cut can only be built on cross slopes between 20 and 70 percent. A through tread cut might be necessary when encountering a small mound, or where the grade needs to be lowered to attain proper profile and shape. The trail should be built to both ends of the problem area. Figure how far the trail needs to be lowered over the distance connecting the high point and low point. Cut

to the desired depth, and proceed with outslope for tread, ditches on the downhill side and uphill and downhill backslopes.

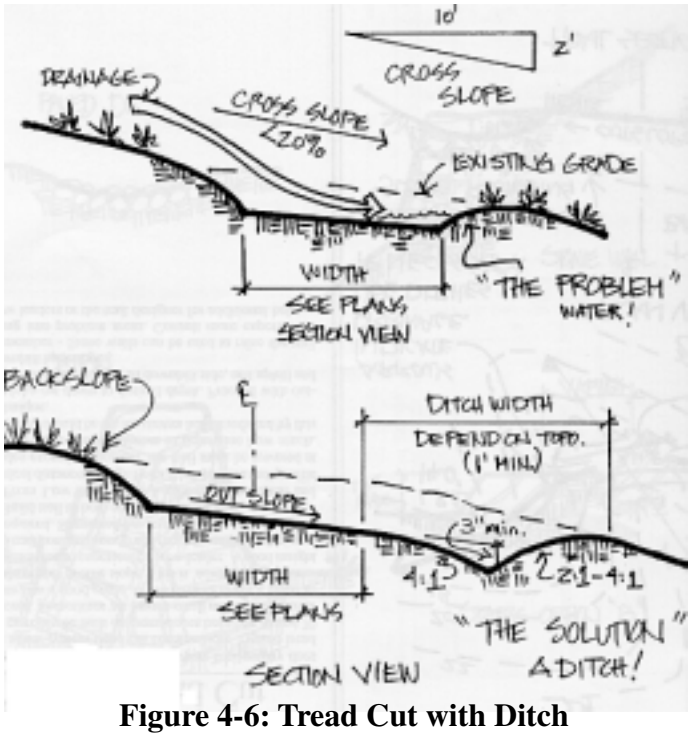


Figure 4-6: Tread Cut with Ditch

[Mountain Trails Management, NPS, p. G-9]

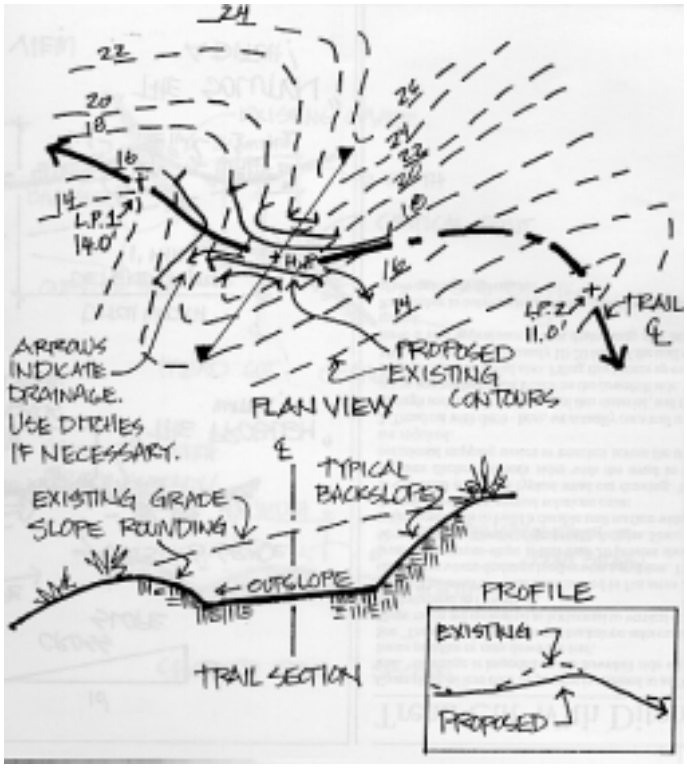


Figure 4-7: Through Tread Cut

[Mountain Trails Management, p G-10]

Trail Tread

Tread-Tread is the actual travel surface of the trail. This is where the foot, rubber or hoof meets the trail. Tread is constructed and maintained to support the intended use of the trail.

Most trail construction revolves around making sure that solid, obstacle-free tread is established and enough protection is provided to keep it in place. If the tread is not located, constructed and/or maintained correctly, the users will find their own pathways instead.

Tread also includes the travel surface on structures like turnpike and puncheon. Tread, whenever elevated, should be slightly crowned to drain better.

Surfacing-Surfacing refers to any material which is laid down on a trail which lessens compaction of soil,

provides a dry surface for users and prevents potential erosion and abrasion. Surfacing is necessary when the natural surface has been damaged or destroyed, when the existing material is unstable and needs protecting and strengthening, or when environmentally sensitive areas need protection and the trail cannot be rerouted.

The type of surface material used will depend on the kind and amount of use the trail receives.
Ideally, natural materials should be used as the surfacing material. When natural materials cannot be acquired, materials which blend with and preserve the natural environment should be used.

In some cases a single layer of surfacing will be sufficient. In other cases, a sub-base may be required such as in areas of wet ground and peat or on trails which flood easily. In these cases, the base is the load-

bearing part of the trail and will comprise the bulk of the material to be used and should have adequate drainage to keep the surface dry.

Each situation which requires surfacing will be unique. How the trail will harden will depend on the soil type, slope, depth of water saturation, the sensitivity of the environment, the trail's expected use, and the availability of natural materials.

Surface Water Control

One of the main concerns in any trail construction is that of effectively diverting surface water off the trail. Running water can erode the tread and support structures, creating unsafe conditions as well as sedimentation problems. Standing water can result in boggy tread or even the failure of the tread and support structures.

Well planned trails include the installation of appropriate and effective drainage structures at the time of original construction. Keep in mind that good drainage is self-maintaining with minimal maintenance demands.

Outsloping-Outsloping is the first line of defense against tread erosion. An outsloped tread is one that is lower on the outside or downhill side of the trail than it is on the inside or bank side. Outsloping lets water run naturally off the trail. Outsloping should continue the entire length of the trail, and is used quite successfully in conjunction with grade dips. The amount of outsloping is small, usually only a few percent. Outsloping is most effective when used in combination with grade dips.

Tread maintenance includes the removal of debris, the filling of ruts and holes and the restoration of the outsloped tread by removing any berm and slough.

Grade Dips-The best grade dips are designed and built during the original construction. These are also called terrain dips, Coweeta dips, and swales. Other versions, often called rolling grade dips, or drain dips, can be built on most sidehill trails or constructed to replace waterbars (dug into existing tread). The basic idea is to use a reversal in grade to force water off the trail without the need for any other structure. The use of grade dips is preferred over structures such as waterbars.

If the grade is steep, the tread carries a lot of water, traffic is high, or the soils are erosive, a grade dip may need some additional strengthening. Sometimes a shallow water channel can be constructed in the last several feet of the tread leading into the dip. Water follows the channel off the tread without slowing down and depositing soil and debris. A spillway may be needed if there is a potential for headcut erosion in the fillslope. The secret is to keep the water moving at a constant velocity until it is all the way off the tread.

Grade dips should be placed frequently enough to prevent water from building enough volume and velocity to carry off your tread surface. Grade dips are pointless at the very top of grades unless they intercept significant amounts of slope drainage. Usually mid-slope is the best location. Grade dips also should not introduce sediment-laden water into streams.

Grade dips are permanent and usually maintenance-free. The construction of grade dips can effectively take advantage of natural features by descending into and then climbing out of slight folds in the terrain. Grade dips provide barrier-free drainage.

Terrain dips use grade reversal to take advantage of natural dips in the trail. These need to be planned into the trail when it is first laid out. The grade of the trail is

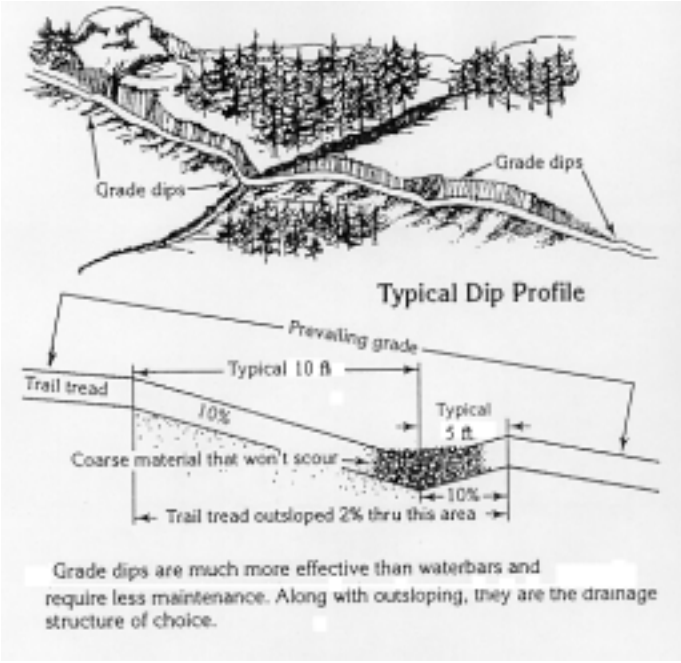


Figure 4-8: Typical Dip Profile
[Trail Construction & Maintenance Notebook, SFS, p. 41]

reversed for about 10 to 15 feet, then rolled back over to resume the descent. A trail that lies lightly on the land will take advantage of each local drainageway swale to remove water from the tread as the trail winds around trees and rocks. The terrain dip, which uses existing terrain as the control point for the grade reversal, is a natural part of the landscape.

The beauty of terrain dips is that water collected from the hillside is not intercepted and carried by the tread. These grade dips are the most unobtrusive of all drainage structures if constructed with smooth grade transitions, and they require very little maintenance. Be sure to protect the drain outlet by placing guide structures along the lower edge of the tread above or below the outlet.

Another kind of grade dip is the **rolling grade dip**, which consists of a short reversal of grade in the tread. These can be designed into most sidehill trails. If a trail is descending at a 7 percent grade, a short climb of 10 to 20 feet at 3 percent, followed by a return to the descent, constitutes a rolling grade dip. Water running down the trail cannot climb over the short rise and will run off the outsloped tread at the bottom of the dip. The beauty of this structure is that there is nothing to rot or be dislodged. Maintenance is simple.

Another grade dip is the **reinforced or armored grade dip**. In this dip, a curved water channel is constructed and an angled (like a water bar) reinforcing bar of rock or wood is placed at the top of the grade reversal. The bar is placed in an excavated trench, with its top edge flush with the existing tread surface so it is not an obstacle to traffic. Essentially, this is a buried waterbar.

This short reinforced grade dip can be built to replace waterbars on existing trails, especially trails used by wheeled vehicles. Well-located waterbars can be converted by constructing a curved water channel and recontouring the outslope from the top of the bar. For longevity it is best if the bar is reseated so that the top edge is flush with the existing tread surface and the channel is constructed with the correctly angled bar as the reference point.

The outlet is critical; it should be at least 1 2 feet wide, and outsloped. In shallow dips the task is to prevent berms, soil buildup, and puddling. Reinforced spillways may also be needed.

Waterbars-The waterbar is another commonly used drainage structure. Water moving down the trail is turned by contact with the waterbar and, in theory, is directed off the lower edge of the trail.

Waterbars can be used to solve a wide range of drainage problems when drain dips are inappropriate. They are usually placed in switchbacks and climbing turns to

prevent water flowing down the upper leg of a trail from continuing onto the lower leg.

Improperly constructed waterbars can be the most ineffective tread structure in all of the trail world. When constructed and maintained correctly, however, they can be effective. By incorporating grade dips into the initial construction of the trail, the need for additional drainage structures will hopefully be avoided.

On grades less than 5 percent, waterbars are less susceptible to clogging (unless they serve a long reach of tread or are in very erodible tread material), and should be set at angles of 20- to 30- degrees. On steeper grades (15 to 20 percent) waterbars are very prone to clogging or even wash out if the bar is less than a 45 degree angle to the trail. Waterbars can be quite dysfunctional at grades steeper than 20%. At these grades a very fine line exists between clogging the drain and eroding it (and the bar) away. However, by utilizing more bars spaced closer together, they can be effective. Drainage ditches installed along the side of the trail may help keep the waterbar clean.

Most waterbars are ineffective because they are not installed at the right angle and are too short. The waterbar needs to be anchored 12 inches into the cutslope and still extend 12 inches into the fillslope. If your tread is 24 inches wide, the bar must be 5 feet, 6 inches long to be correctly installed at a 45 degree angle. A bar fitted to 60 degrees must be 7 feet, 7 inches long. Wider tread requires a longer bar. When the bar is cut too short, the usual response is to install it at a lesser angle. Then it clogs.

Poorly constructed and maintained waterbars also become obstacles. Most waterbars are installed with one-third to one-half of the bar material above the existing tread surface. On grades steeper than 7 % (particularly in erodible soils), the soil placed on the tread below the waterbar is rapidly lost to traffic and water erosion. The structure becomes a “low hurdle” for travelers. Waterbars should be set so that it rises no more than 2 to 4 inches above the level of the tread (uphill side).

Bars less than 6 inches in diameter wear or clog quickly into uselessness. Often they rot away in just a few years. Another problem with wooden waterbars is that horses kick them out. They also can present a safety hazard for cyclists.

Wood or rock waterbars are useful on foot and stock trail where a tripping hazard is acceptable, especially at grades less than 5%. Also consider reinforced waterbars where you do not have much soil to work with and in areas that experience occasional torrential downpours.

The bar helps keep traffic from wearing a water carrying groove through the drain. Install the bar at an angle of at least 45 degree and increase the angle as the grade approaches 5 percent or if the soils are very erodible

Remember that high-faced bars are barriers to wheeled traffic. On trails that serve wheeled traffic, use either reinforced grade dips or rubber waterbars instead of traditional waterbars.

An important consideration is the number and spacing of waterbars on a section of trail. Variables to consider in determining the spacing of waterbars include the grade of the trail, the type of soil, the amount of runoff, the amount of use and the movement of the water off of the trail. Spacing appropriate to each unique site should be developed based on soils, precipitation and use.

When installing waterbars keep the following in mind:

1) the waterbar should fit the characteristics of the site, and be located as near as possible to the top of the pitch grade or as close to the source of the water as possible

2) avoid locating waterbars where a long outlet ditch is needed

3) don't install a waterbar if the discharge is onto a steep slope or part of the trail

4) the discharge should be into a filter area (vegetation present)

5) waterbars are useful when located near switchbacks and turns such that the flow of discharge water can continue without disturbing the trail.

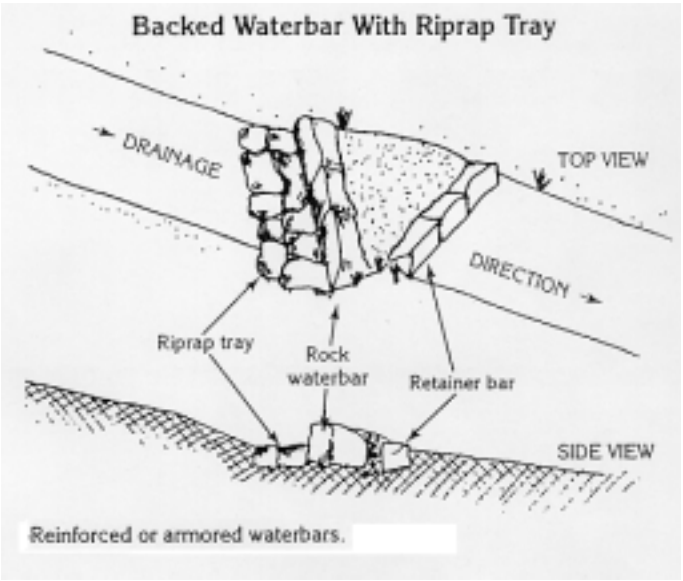


Figure 4-9 : Backed Waterbar with Riprap Tray

[Trail Construction & Maintenance Notebook, USFS, p. 45]

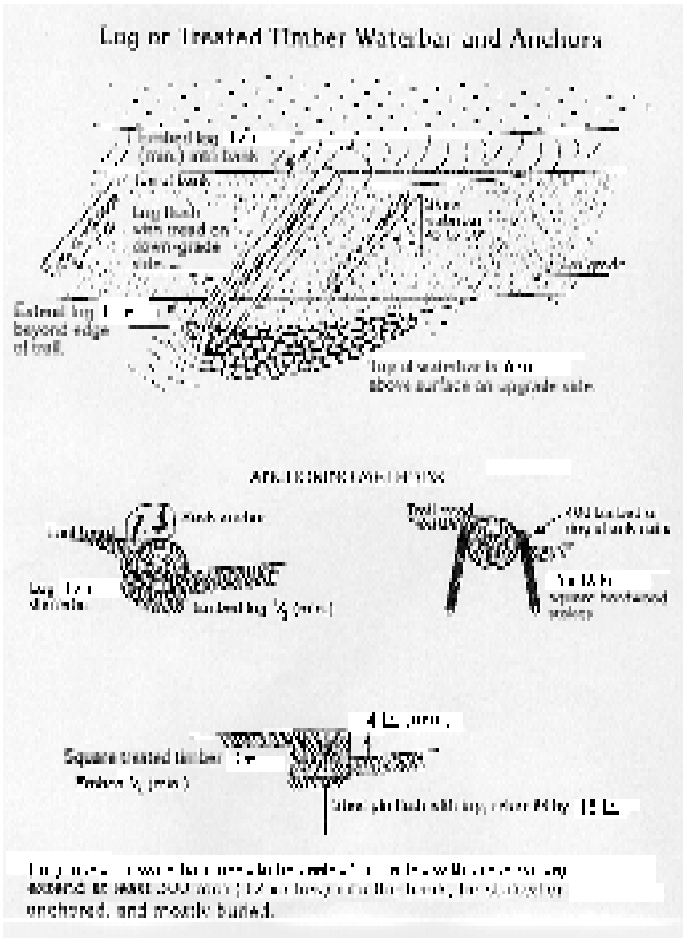


Figure 4-10: Log or Treated Timber Waterbar and Anchors

[Trail Construction & Maintenance Notebook, USFS, p.47]

Traditional waterbars should not be used on biking or equestrian trails due to the associated hazards. There are some designs for modified waterbars promoted for use on biking trails, but in general, there is dissatisfaction with their longterm use.

Check Dams-Check dams are steps that create a terraced section of trail, using rocks or logs. Treated lumber or peeled logs should be used, rather than unpeeled logs. The height of the installed logs is determined by what is required to restore the trail tread to its pre-erosion state. If a series of dams are installed, it is best to use a string to measure placement, and keep them equal distance apart, for ease in walking this section of trail. Check dams are placed across the trail at a 90

degree angle, with a minimum of 5 inches into the undisturbed bank for anchoring. They should be staked or anchored securely with rebar or wooden stakes. They are effectively used on old trails which are being abandoned to help with the reclamation process. Check dams can be major obstacles to users if not backfilled

Wet Area Crossing Structures and Techniques

Drainage-Although an area may appear perfectly flat, often it will have a slight gradient and flow of water. Drainage ditches and culverts can ensure that water drains off the trail.

Generally, **ditches** are at least 12 inches deep, have flat bottoms, and side slopes of 1:1. In many cases, the ditch can be extended beyond the wet area to capture water that might flow into the trail.

A **French drain** is an open drain can be filled with crushed stone, stone or aggregate. This is called a French drain. Start with larger pieces of rock and gravel

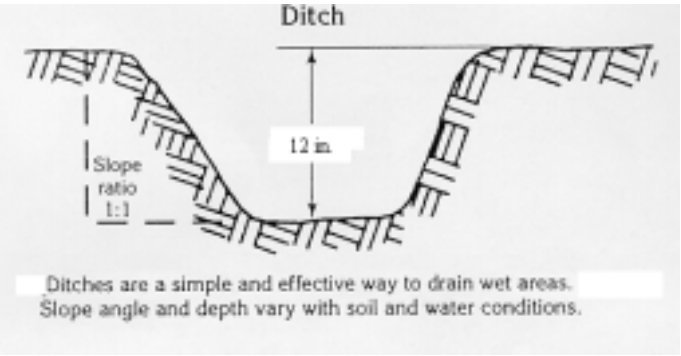


Figure 4-11: Ditch

[Trail Construction & Maintenance Notebook, USFS, p. 55]

at the bottom, topping off with smaller aggregate. French drains are often used to drain a spring or seep from under a trail bed. The use of geotextiles are common with these drains. The geotextiles reduce the infiltration of fines and increase the effectiveness of the drain.

Culverts are probably the best way to move small volumes of water across a trail. The tread extends over

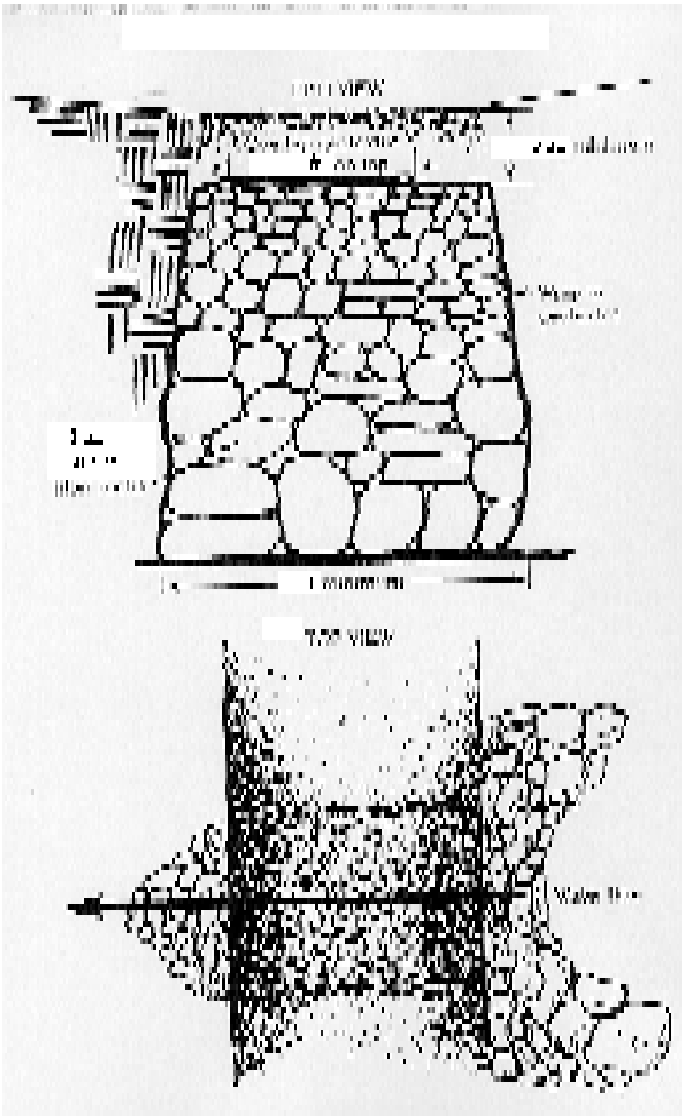


Figure 4-12: French Drain

[Trail Construction & Maintenance Notebook, USFS, p. 57]

the culvert without interruption. A disadvantage to culverts is that they require regular maintenance. Metal or plastic culverts can be installed easily, or the culverts can be constructed out of rock. Dig a ditch across the trail as wide as the culvert and somewhat deeper. Bed the culvert in native soil shaped to fit the culvert. There also needs to be sufficient drop, about 3 percent, from one side to the other so water will flow through the culvert without dropping sediment. The culvert needs

to be covered with 6 inches or more of fill. Cut the culvert a little longer than the trail width, and build a rock facing (headwall) around each end to shield it from view and prevent it from washing loose. Often a rock-reinforced spillway will reduce headcutting and washouts.

Use a culvert with a diameter large enough to handle maximum storm runoff and to be accessible for cleaning with a shovel or combination tool. Usually this means at least a 9-inch diameter culvert.

Rock culverts offer a chance to display some real trail skills. Begin by laying large flat stones in a deep trench to form the bottom of the culvert. In some installations, these bottom rocks may not be necessary. Then install large, well-matched stones along either side of the trench. Finally, span the side rocks with more large, flat rocks placed tightly together, enough to withstand the expected trail use. Cover the top rocks with tread material to hide and protect the culvert. These culverts, too, need to be large enough to clean out easily. The rocks should not wiggle.

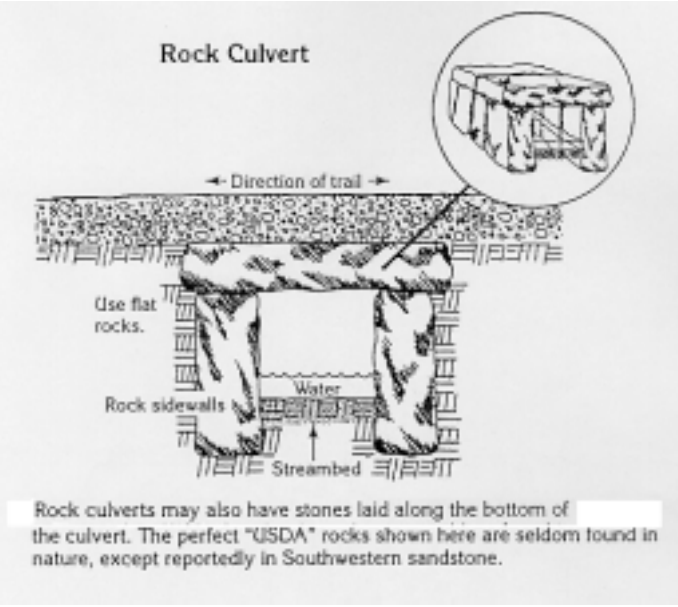


Figure 4-13: Rock Culvert
[Trail Construction & Maintenance Notebook, USFS, p. 59]

Water flowing toward a culvert often carries a lot of silt. If the water slows as it goes under the trail, the silt may settle out and clog the culvert. A good way to help prevent this from happening is to construct a **settling basin** at the inlet to the culvert. This is a pit at least 1 foot deeper than the base of the culvert. It can be lined with rocks as desired. The idea is that sediment will settle out here, where it is much easier to shovel away, rather than inside the culvert.

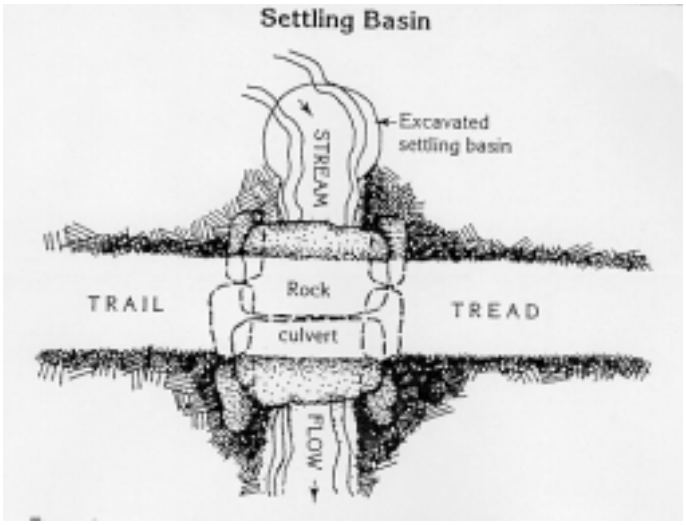


Figure 4-14: Settling Basin
[Trail Construction & Maintenance Notebook, USFS, p. 60]

Turnpike-Turnpikes are used to elevate the trail above wet ground. The technique uses fill material from parallel side ditches and from offsite to build up the trail base higher than the surrounding water table. Turnpike construction is used to provide a stable trail base in areas of high water table and fair to well drained soils. Turnpikes are practical up to 10 percent trail grade.

Turnpikes should be used primarily in flat areas with 0 to 20 percent side slope where there is wet or boggy

ground. The most important consideration is to lower the water level below the trail base and carry the water under and away from the trail at frequent intervals. Turnpikes require some degree of drainage. When the ground is so wet that grading work can not be accomplished and drainage is not possible, use puncheon surfacing instead. However, a turnpike is easier and cheaper to build and may last longer than a puncheon. A causeway is another alternative where ground water saturation is not a problem but a hardened tread is needed.

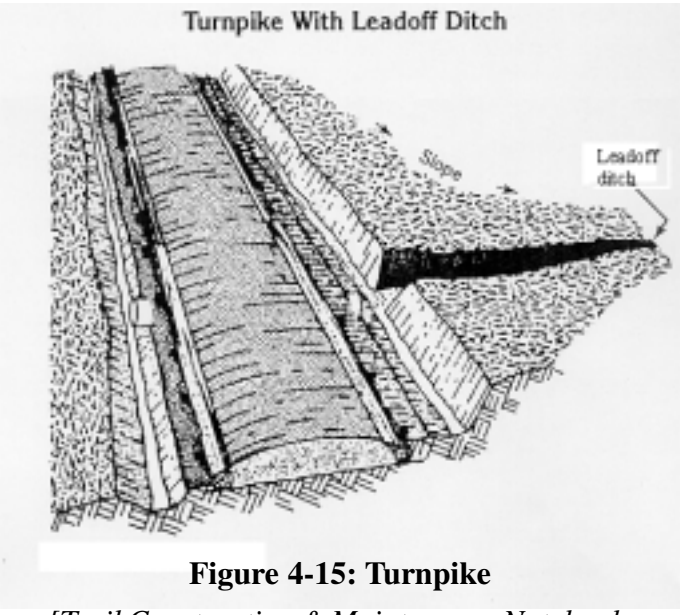


Figure 4-15: Turnpike

[Trail Construction & Maintenance Notebook, USFS, p. 67]

Begin your turnpike by clearing the site wide enough for the trail tread plus a ditch retainer log or rocks on either side of the trail tread. Rocks, stumps, and stobs that would protrude above the turnpike tread or cause large rips in the geotextiles should be removed or at least cut flush below the final base grade.

Ditch both sides of the trail to lower the water table. Install geotextile or other geosynthetic materials, and retainer rocks or logs. Geotextile and geogrid should go under any retainer rocks or logs. Lay the geotextile over the top with no excavation, then fill over with high quality fill.

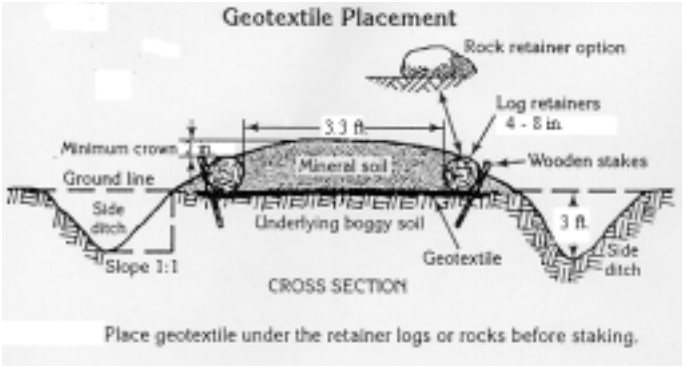


Figure 4-16: Geotextile Placement

[Trail Construction & Maintenance Notebook, USFS, p. 68]

Rocks or logs can be used for retainers. Rocks last longer. If you use logs, they should be at least 6 inches in diameter and peeled. Lay retainer logs in one continuous row along each edge of the trail tread. The logs can be notched to join them, if desired. However, in some species notching may cause the logs to rot faster. Ideal logs to use would be black locust, but if it is not available, hardwoods such as oak or hickory work well. Avoid pine or "soft" hardwoods.

Anchor the logs with stakes or, better yet, large rocks along the outside. Inside, the fill and surfacing hold the retainer logs.

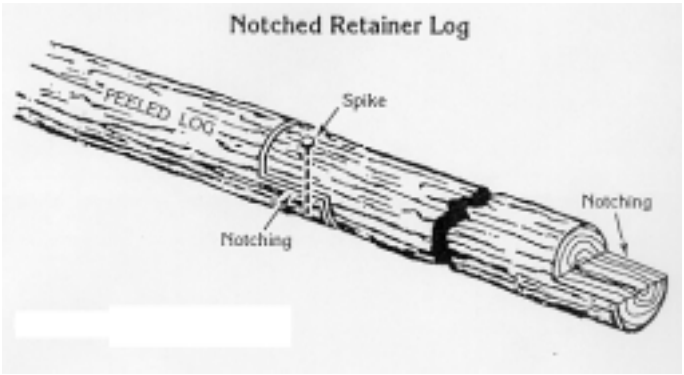


Figure 4-17: Notched Retainer Log

[Trail Construction & Maintenance Notebook, USFS, p. 69]

Firm mineral soil, coarse-grained soils or granular material, or small, well-graded angular rock are needed for fill. Often it is necessary to haul in gravel or other well-drained material to surface the trail tread. If good soil is excavated from the ditch, it can be used as fill. Fill the trail until the crown of the trail tread is 2 inches above the retainers. It doesn't hurt to overfill to begin with, as the fill will settle. Use rocks as the base layer of fill and decrease their size as you fill closer to the tread surface.

Construct a dip, waterbar, or a drainage structure at each end of the turnpike where necessary to keep water from flowing onto the structure. Keep the approaches as straight as possible when coming onto a turnpike.

Puncheon-Puncheon is a wooden walkway used to cross bogs, small streams, or fragile terrain. It can be used where uneven terrain or lack of tread material makes turnpike construction impractical. It can be supported on muddy surfaces better than turnpike, which requires effective drainage.

Puncheon consists of a deck or flooring made of treated timber or native logs placed on stringers to elevate the trail across wet areas that are not easy to drain. Puncheon that are slightly elevated are termed surface puncheon. Puncheon placed flush with the wetland surface is known as subsurface puncheon.

The simplest type of puncheon is a topped-log puncheon, made with two stringers that form the treadway and set on top of two base logs, that serve as the sills. Hew the timbers to make a flat walking surface and score the surface with an axe. Level each sill and cut notches where the stringers will be attached. Sills should be set 2 inches into the soil surface to provide for added stability. For stringer spans over 10 feet, a

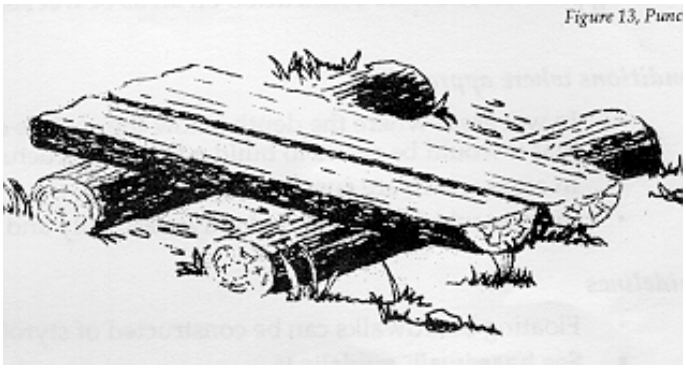


Figure 4-18 : Topped-Log Puncheon

[Best Management Practices for Erosion Control During Trail Maintenance & Construction, NH, p. 25]

center sill should be used. Use natural rot resistant wood, such as cedar or locust, or treated timber to reduce the potential for decay.

When constructing puncheon, it is important that the entire structure extends to solid mineral soil so that soft spots do not develop at either end. The approaches to the puncheon should be straight for at least 10 feet. The first step is to install mud sills. These support the stringers. Mud sills can be native logs, treated posts or short treated planks, and are laid in trenches at both ends of the area to be bridged at intervals of 6 to 10 feet. They should be buried about two-thirds in firm ground. Rock and fill may be used to solidify the bottom long as practical up to 8 feet.

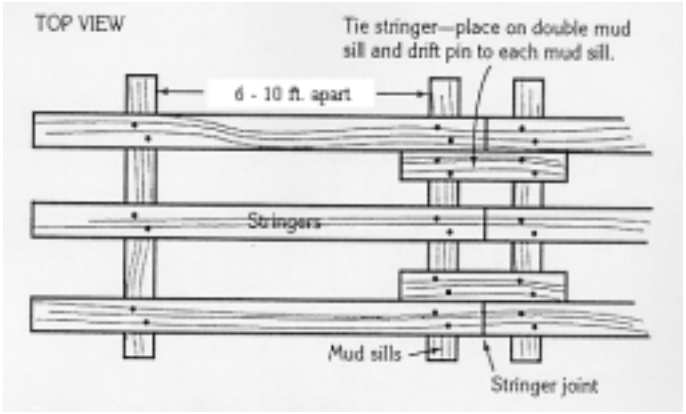


Figure 4-19: Mud sill and stringer layout

[Trail Construction & Maintenance Notebook, USFS, p.73]

Stringers are set on top of the mud sills. They should be at least 10 feet long and matched by length and diameter. They need to be level with each other so the surface of the puncheon will be level when the decking is added. Two stringers are sufficient for hiking trails, but more should be used for equestrian trails. Stringers can be peeled logs or treated timbers. To hold the stringers in place, toenail spikes through the stringers to the mud sills or drive 1/2-inch rebar through holes in the stringers.

Installation of the decking is the next step. If using a center stringer, do not spike decking to it, as the center spikes may work themselves up with time and become obstacles.

Leave at least a 3/4 inch gap between decking to allow water to run off. The thickness and lengths of the decking depend on the loads the structure will need to support.

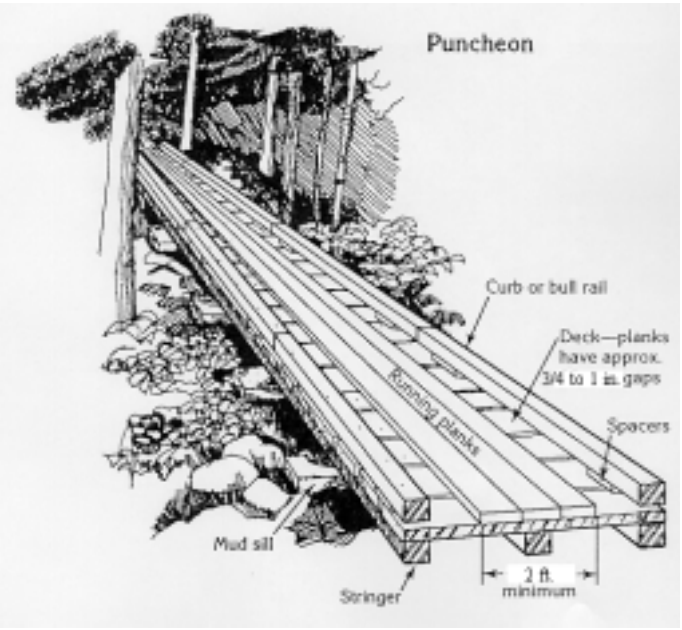


Figure 4-20: Puncheon

[Trail Construction & Maintenance Notebook, USFS, p. 71]

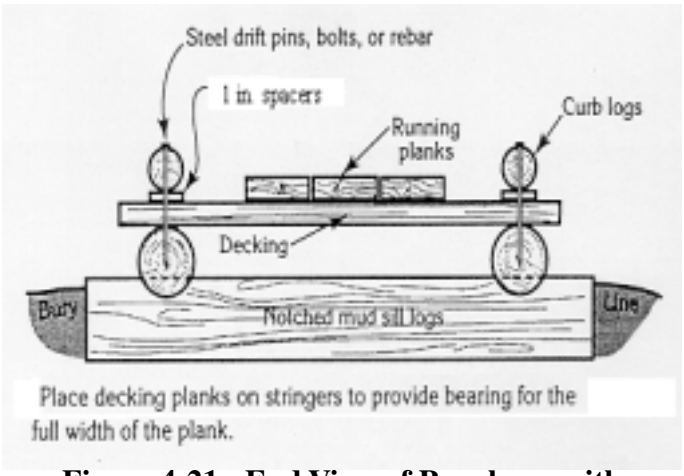


Figure 4-21: End View of Puncheon with decking, running planks, and curb logs

[Trail Construction and Maintenance Notebook, USFS, p.74]

Running planks can be added down the center for horses to walk on. Do not leave gaps between running planks because they can trap wheeled vehicles (service vehicles). Curb logs should be placed along each side of the puncheon for the full length of the structure to keep traffic in the center. To provide for drainage, nail spacers between the curb logs and the decking.

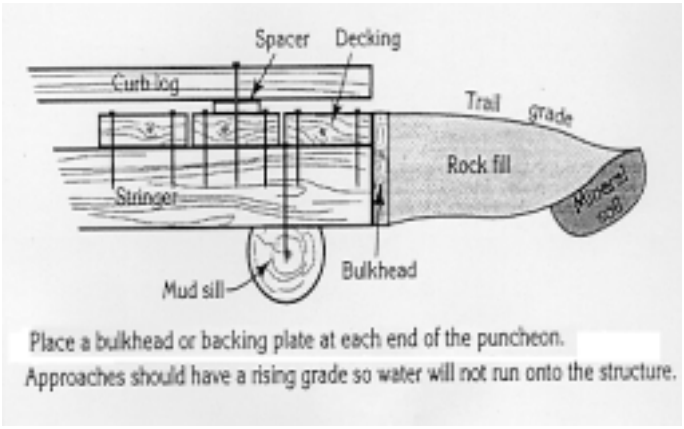


Figure 4-22: Bulkhead/backing plate on Puncheon

[Trail Construction & Maintenance Notebook, USFS, p.75]

The final step is to place a bulkhead or backing plate at each end of the structure to keep the strings from contacting the soil. Do not spike it to the ends of the stringers, as spiking causes the stringers to rot faster.

If puncheon is constructed on grades steeper than 5 percent, treat the surface to reduce slipping.

Geosynthetics-Geosynthetics are synthetic materials that are used with soil or rock in many types of construction. They can increase the effectiveness of construction methods and offer some additional alternatives to traditional trail construction practices.

Geosynthetics perform three functions: separation, reinforcement, and drainage. Geosynthetic materials include geotextiles, geonets, sheet drains, geogrids and geocells. All these materials become a permanent part of the trail, but must be covered with soil or rock to prevent deterioration by ultraviolet light or damage by trail users.

Geotextiles are the most widely used geosynthetic material and are sometimes called construction fabric or filtercloth. They are made from long-lasting synthetic fibers bonded to form a fabric. They are used primarily for separation and reinforcement over wet, unstable soils. They support loads and allow water, but not soil, to seep through. Geotextiles are often used in trail turnpike construction. They serve as a barrier between the silty, mucky soil beneath the fabric and the mineral coarse-grained or granular soil placed as tread material on top of the fabric. This insures that the tread surface does not become mud. The openings should be .3 mm or less to prevent silt from passing through. Since geotextiles can decompose when exposed to sunlight, store unused material in its original wrapper.

Geonets have a thin polyethylene drainage core that is covered on both sides with geotextile. They are used for separation, reinforcement and drainage. Geonets have a core plus two layers of geotextile, and thus provide more reinforcement than a single layer of geotextile.

Sheet drains are another form of a composite made with a drainage core and one or two layers of geotextile. The core provides an impermeable barrier unless perforated. When used under the trail tread material, sheet drains provide separation, reinforcement and drainage. They have greater bending strength than geotextiles or geonets, and thus require less tread fill. Sheet drains can be used as drainage cutoff walls. If the trail section is on a side slope where subsurface water saturates the uphill side of the trail, a cutoff wall can be constructed to intercept surface and subsurface moisture, helping to drain and stabilize the trail section.

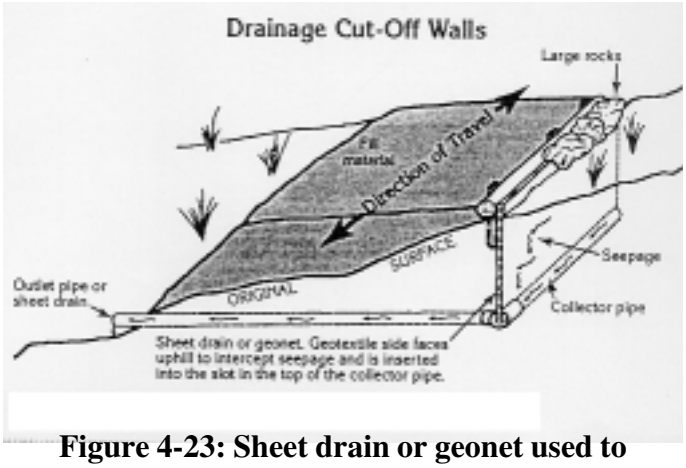


Figure 4-23: Sheet drain or geonet used to intercept seepage

[Trail Construction & Maintenance Notebook, USFS, p. 63]

Geogrids are made from polyethylene sheeting that is formed into very open grid-like configurations. They are good for reinforcement because they have high tensile strengths, and coarse aggregate can interlock into the grid structure. They are normally placed on top of a

layer of geotextile to obtain separation from saturated soils in wet areas.

Geocells are usually made from polyethylene strips bonded to form a honeycomb structure. Each of the cells is filled with backfill and compacted. Geocells are good for reinforcement, and reduce the amount of fill material required, and help hold it in place. Geocell usually has geotextile under it to provide separation from saturated soils. The grids need to be covered with soil so they will not be exposed.

Water Crossing Structures

Shallow Stream Ford-A ford is a shallow stream crossing that utilizes the stream bed. It is a consciously constructed crossing that will last for decades with a minimum of maintenance (barring major flood or debris torrent) and will provide a relatively low challenge to users.

The idea behind a shallow stream ford is to provide solid footing, at a consistent depth from one bank to the other. Most fords are not designed to be used during high runoff, but are intended to be used when flows are moderate to low. A ford for hikers should not be more than 16 to 24 inches deep (about knee high) during most of the use season. A horse ford shouldn't be deeper than 39 inches. Equestrians favor fords over other types of stream crossings.

Fords should be located in wider, shallower portions of the stream. The approaches should climb a short distance above the typical high water line so that water isn't channeled down the tread. Avoid locations where the stream turns, because the water will undercut approaches on the outside of the turn.

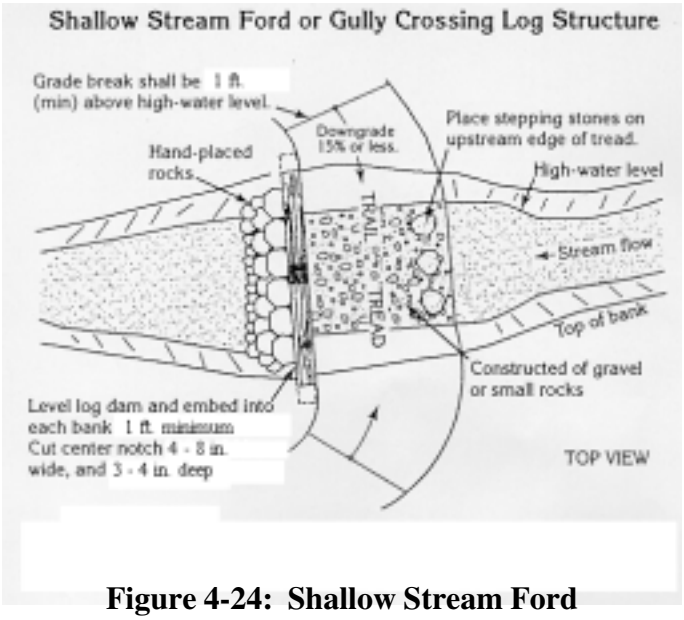


Figure 4-24: Shallow Stream Ford

[Trail Construction & Maintenance Notebook, USFS, p.78]

The tread in the ford is level, ideally made of medium-sized gravel, which provides solid footing. The plan is to even out the flow through the ford so the gravel-sized material isn't washed away, leaving only cobble or boulders.

This can be done by arranging a level riprap of big rocks (like a miniature dam) or anchoring a log about 3 to 7 feet downstream from the trail centerline. The idea is to evenly slow the water as it goes across the ford. This slowing effect can be enhanced by placing several rows of stepping stones or rocks upstream from the tread. These slow the water entering the ford and begin to even out the flow. Be sure these upper rocks are not too close to the trail to avoid a scouring effect.

Well-constructed shallow stream fords are almost maintenance free. Watch for deep spots developing in the crossing. Floods or seasonal runoff can wash away the approaches or parts of the dam. Debris can catch in the dam or stepping stone line and alter flow

characteristics. Approaches can erode into jumpoffs or turn into boggy traps. Maintenance consists of retaining or restoring the design criteria of an even shallow flow with solid footing.

Concerns that can arise from the use of fords include the generation of bank erosion, disturbance of aquatic life, the generation of water quality problems due to disturbing the natural stability of the stream bed, as well as posing some danger to the user.

Stepping Stones-Stepping stones are large flat topped rocks set into a stream that allows for dry passage. They are a standard solution for low wet and boggy areas, and work well when well placed.

Stepping stones are the option of least environmental impact that accomplish the objective of protecting the environment and providing dry passage. The ideal location for placing stepping stones is in shallow streams with light to moderate water flows. Avoid their use where dangerous stream flooding may occur.

When placing stepping stones, set stones approximately 1-1/2 feet apart with the flat surface facing up. The placement of stepping stones at the edge of the stream must not create stream bank erosion or cause water to undercut the bank. If the stepping stones are unsteady, they may not be set correctly or be large enough.

Stepping stones are generally appropriate for hiking and walking trails, but are not universally accessible. Stagger stones to reduce potential damming of debris between stones. The distance of stepping stones can be adjusted to accommodate the majority of users. The stone surface area should be a minimum of one square foot in size. Wet areas or streams with soft mucky bottoms may not adequately support stepping stones.

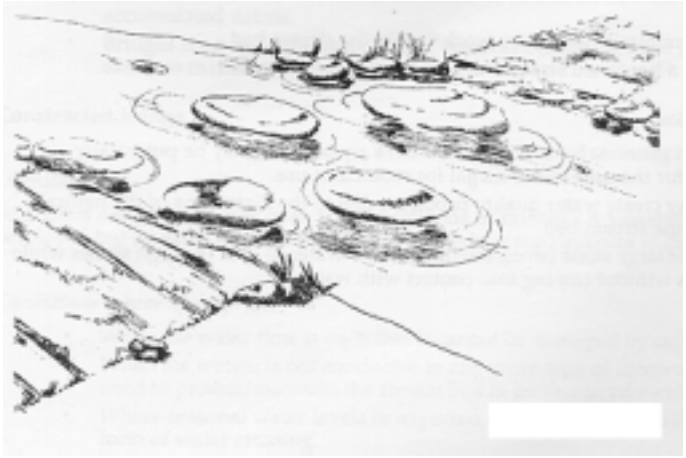


Figure 4-25: Stepping Stones

*[*Best Management Practices for Erosion Control During Trail Maintenance & Construction*, NH, p. 19]*

Boardwalks-Boardwalks are fixed planked structures, usually built on pilings, erected in areas of wet soils or water to provide for dry crossing. Boardwalks are especially useful when other forms of wet soil crossings are inappropriate due to the restriction of surface water flow, in areas of fragile habitat such as bogs or marshes, and in areas susceptible to flooding.

Boardwalks also provide for universal accessibility. Boardwalks should be designed to enhance the visitor's experience of the environment, and are often used to provide an interesting means of access to shorelines and wetlands. In our coastal parks, boardwalks are a means of providing visitors access to marsh, wetlands and shoreline with minimal and controlled impact on the fragile environment.

All wood used in construction should be either pressure treated or naturally rot resistant species. The planks should be placed perpendicular to the direction of travel. The width of the boardwalk will depend on the expected use and whether the trail will be designed for one- or two-way travel. Boardwalks constructed on equestrian

trails must be designed and constructed to support the intended load. Handrails and wheelguards may be added as a safety or accessibility feature, depending on the expected use of the trail.

The simplest boardwalk design is that of a light duty structure used in crossing occasionally damp or wet areas. It is sometimes referred to as a bog bridge, or puncheon. See the section on puncheon in "Wet Area Crossing Structures".

A more substantial boardwalk structure is one supported on piers or pilings and is used in wet areas and over small streams or marsh environments. The intended user group must be taken into consideration in the design and selection of size of pilings, stringers and decking. Designing the boardwalk with a curving shape, adding spurs, adding widened observation decks and varying the width of the deck at intersections enhances its appeal to users.

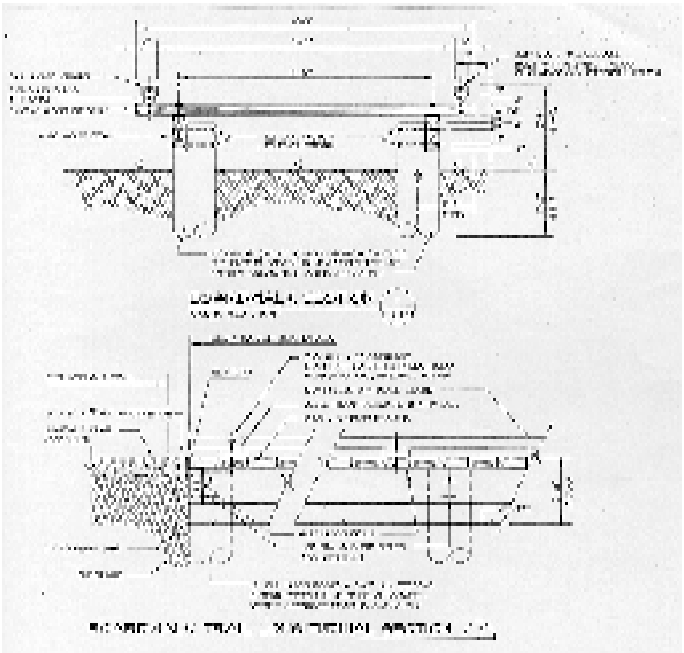


Figure 4-26 : Boardwalk Supported on Piers or Pilings

Lumber used should be rot resistant. All connecting hardware should be galvanized. Consider using decking screws instead of nails to fasten the decking to facilitate replacement or resetting. The supporting piers or pilings are typically pressure treated timbers driven into the wetland soil, or a concrete structure placed on the stream bottom with timbers imbedded. Galvanized helical screw piers can alternatively be used, minimizing the impact to the wetland, and offering easier installation. However, the expense of the helical screw piers is often a deterrent.

Bridges-Bridges are structures designed to cross open water, wetlands or ravines. A variety of designs are employed but all generally involve fixing both ends of the structure to dry land. Bridges range from a simple foot log with handrails to multiple span, suspended, and truss structures. Bridges that span roads, rivers, or require specialized design to support design loads and withstand expected flood events should be engineered by DCR's Design and Construction section.

On hiking trails, foot logs can be used to cross streams where safe fords cannot be located or to provide access during periods of high runoff. Constructed foot logs consist of a log, sills, and bulkheads. The foot log should be level and well anchored. Notch the sill, not the log. The top surface should be hewn to provide a walking surface at least 10 inches wide. Don't let the log or rails touch the ground. Remove all the bark from the logs and poles.

If the foot log is associated with a shallow stream ford, be sure to position the log upstream or well downstream of the ford. Logs immediately below the crossing can trap travelers who lose their footing in the ford. If you have handrails, construct them according to plan.

Choosing the appropriate material for a bridge is not a simple process. The use of pressure treated lumber, metal, concrete, wood laminates and other composites requires the transportation of these materials to the site. However, the cost is likely to be well worth the longevity and durability of the finished product, compared to using native materials and their typically frequent replacement requirements, as well as meeting load bearing requirements.

The construction of bridges is a last resort after other options in trail location have been considered. In addition to the challenge of getting materials to the site, bridge construction usually requires significant erosion control measures due to the proximity to wetlands, or water. Considerations for bringing the trail surface up to the level of the bridge deck, providing for adequate drainage on the approach and bridge itself, and insuring that the approach is stable and not subject to erosion and thus threatening the bridge anchoring design all need to be made. Additionally, if the bridge is located on equestrian trails, the bridge should be of sufficient width and with solid approaches to provide horses solid, sure footing.

Special Structures

Special structures such as climbing turns, switchbacks and cribwalls are common in trail construction. They can be expensive and difficult to design and construct correctly. However, a well-designed, well-built trail structure can last for decades and be quite unobtrusive. Retaining structures are designed to keep soil and rock in place. The crib wall keeps fill from following the call of gravity and taking the tread with it. .

Planning carefully to avoid difficult terrain reduces the need for climbing turns and switchbacks.

Improperly constructed handrails are a big liability, because they are not strong enough.

User psychology is more important to the success of these structures than any other trail structure. The turns must be easier, more obvious, and more convenient than the alternatives. They work best when terrain or vegetation screens the view of travelers coming down the upper approach toward the turn. Long legs between turns help reduce the temptation to shortcut. The designer's goal is to make the trail more attractive than the shortcut.

Climbing Turn-A climbing turn is a reversal in direction that maintains the existing grade going through the turn without a constructed landing.

Next to waterbars, climbing turns are the trail structure most often constructed inappropriately. The usual problem is that a climbing turn is built (or attempted) on steep terrain where a switchback is needed. A climbing turn is built on the slope surface, and where it turns, it climbs at the same rate as the slope itself. It is almost impossible to keep a climbing turn from eroding and becoming increasingly difficult to travel if the slope is steeper than 20 percent.

The advantages of climbing turns in appropriate terrain is that a larger radius turn (13 to 20 feet) is relatively easy to construct. They are usually less expensive than switchbacks because much less excavation is required, and fill is not used.

The tread at each end will be full bench construction, matching that of the approaches. As the turn reaches the fall line, the amount of material excavated will decrease. In the turn, the tread will not require

excavation other than that needed to reach mineral soil. Guide structures should be placed along the inside edge of the turn.

A climbing turn should be located so that it curves around an obstacle such as dense brush , a thicket of trees or other natural features. Be sure to design grade dips into the approaches.

Switchbacks-A switchback is a reversal in direction, but has a relatively level constructed landing (figure). Switchbacks usually involve special treatment of the approaches, barriers, and drainages. They are used on steeper terrain, usually steeper than 15 percent to 20 percent.

Switchback turns are harder to build correctly, but retain stable tread on steeper terrain. The key to successful switchback construction is making an adequate excavation, using appropriate structures to hold the fill in place, and building psychologically sound approaches.

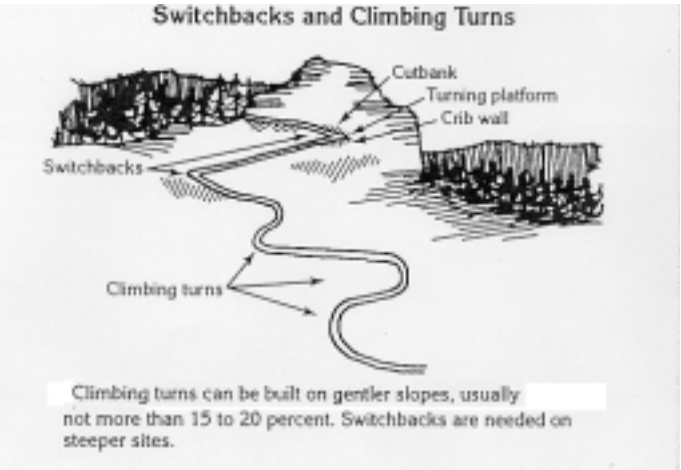


Figure 4-27: Switchbacks and Climbing Turns
[Trail Construction & Maintenance Notebook, USFS, p. 85]

Look for "natural" platforms when you are scouting for possible switchback locations. Use these for control points when locating the connecting tread. These will save a lot of time later by reducing the amount of excavation and fill needed.

A switchback consists of two approaches, a landing or turning platform, a drain for the upper approach and platform, and guide structures. The upper approach and the upper half of the turn platform are excavated from the slope. Part of the lower approach and the lower half of the turn are constructed on fill.

The approaches are the place where most of the trouble with the switchback turns start. In general, the last 65 feet to the turn should be as steep as the desired challenge level will allow.

The turn can be a smooth radius ranging from 5 to 10 feet or a simple Y-shaped platform. The turn platform is nearly flat, reaching no more than a 5 percent grade. The upper side is excavated from the side slope and the borrow used to construct the fill on the lower side. The greater the turn radius, the wider the platform, or the flatter the turn, the greater the excavation required. A point may be reached where a crib wall is needed to keep the backslope to a reasonable size.

The tread in the upper portion should be insloped, leading to a drain along the toe of the backslope. You may need guide structures - rock walls or logs are common - on the inside of the turn to keep traffic on the trail.

Construct the approach on the lower side of the turn on tamped fill. The crib wall should extend for most of this length. The tread on the lower portion of this turn should be outsloped. The fill section transitions into

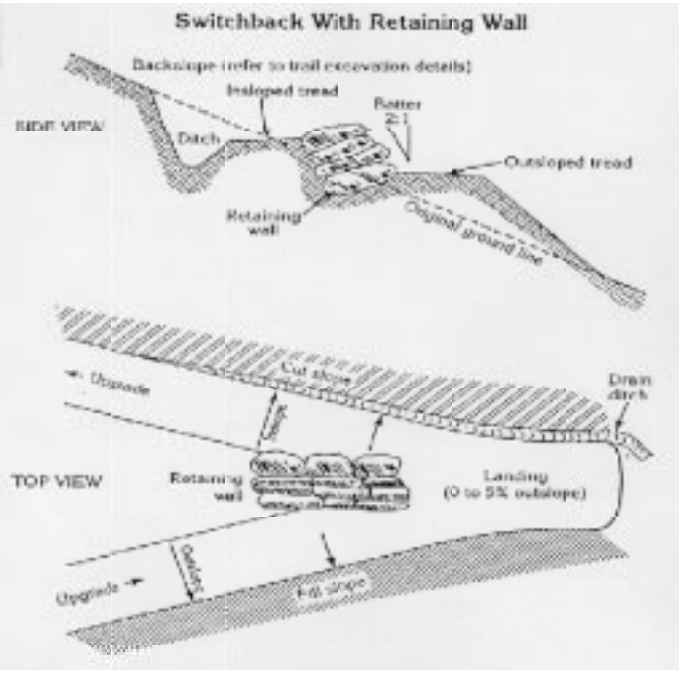


Figure 4-28: Switchback

[Standard Specifications for Constructing Trails, USFS, Section 914]

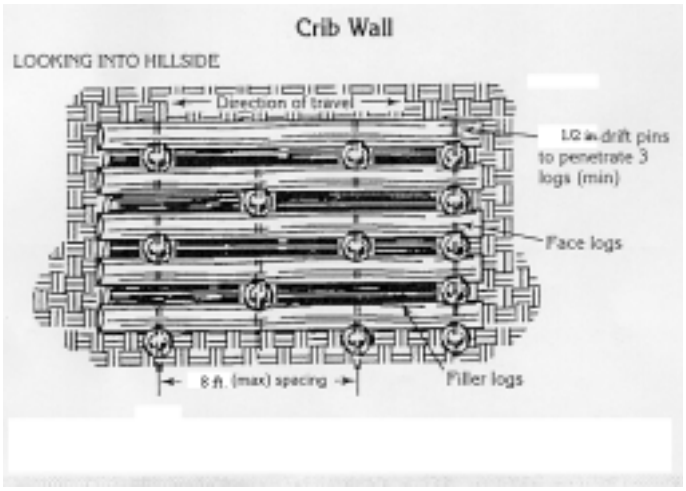


Figure 4-29: Crib Wall

[Trail Construction & Maintenance Notebook, USFS, p. 92*]*

the full bench part of the approach; the approach changes grade to match the general tread grade.

Cribwall-The crib wall is used primarily to keep compacted fill in place. It is useful where vegetation will not provide sufficient protection for soil erosion and sedimentation problems or where the slope is too steep to establish and maintain vegetation.

Construct wood crib by interlocking logs or beams, pinned or notched (if logs) at joints. Lay sill logs at right angles to the direction of travel and alternate tiers of face logs and header logs. Each successive tier is set to provide enough batter to resist creep pressure from the slope and to reduce pressure on the face of the logs from the hill. The ends of the header logs are seated against the backslope of the excavation for stability. As fill is tamped in place, filler logs are placed inside the structures to keep traffic off the edge.Wood crib is easier to build than rock cribbing, but is less durable.

Rock Walls- Rock or crib retaining walls are used when a sturdy wall is needed to contain compacted fill or to hold an excavated wall in place. Rock, when available on site, is preferred over logs.

To build a rock wall, excavate a footing in soil or to solid rock. The footing should be insloped to match the desired batter angle and deep enough to support the foundation tier of stones (these are usually the largest stones in the wall) for the full width of the tread. Ideally, the footing is dug so that the foundation tier is embedded for the full thickness of the stones.

Ideally, the stones should weigh at least 45 pounds. At least half of the stones should weigh more than 130 pounds. The ideal stone is a rectangular with flat surfaces on all sides. The worst stone to use is rounded like a river rock.

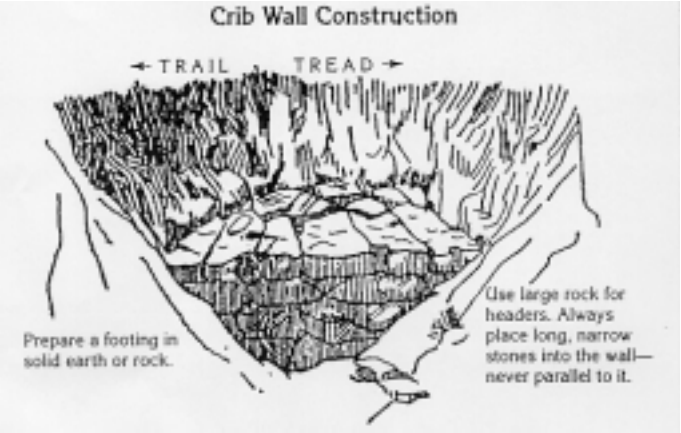


Figure 4-30 : Rock Cribbing

[Trail Construction & Maintenance Notebook, USFS, p. 94]

structure to plug the spaces between the face logs, and are held in place by the fill. Outslope the tread to keep water from saturating the fill and excavation. Use guide The batter should range from 2:1 to 4:1 (figure). Factors determining this angle include the size and regularity of the rock, the depth of the header stones, and the steepness and stability of the slope. At batter angles steeper than 4:1 or so, cement, or internal anchors (or both) may be needed for stability.

On short walls, it may be possible to construct the entire structure starting upon a single keystone. The keystone

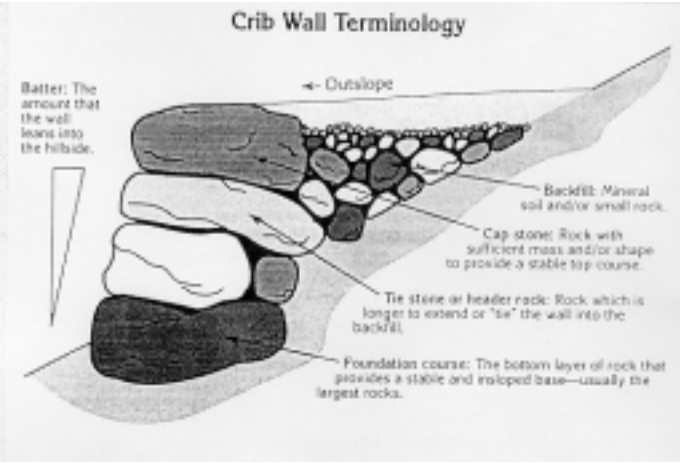


Figure 4-31: Rock Crib Wall Terminology

*[*Trail Construction & Maintenance Notebook*, USFS, p.95]*

is laid into the footing and successive tiers are laid. Each tier's face stones overlap the gaps between stones in the next lower tier. Each face tier includes tie or header stones that overlap the gaps between face stones and those deeper in the wall. The foundation tier (or the keystone) should be insloped slightly and rest on the excavated surface, not on fill. Each successive face tier should be staggered slightly into the hill to create the desired amount of batter. Header stones should also be used to tie deeper stones to those closer to the face. This is particularly important if the wall widens in cross section as it gains height.

Stones in each successive tier should be set so they have at least three points of good contact with the stones below. Good contact is defined as no wobble or shifting under a load without relying on shims (or chinking) to eliminate rocking. Backfill and tamp as you build.

Steps-Steps are sometimes used in an existing trail to fix a problem caused by poor trail location or design. The result often is out of character with the desired experience and aesthetics of the trail. Before you construct steps, make sure they are consistent with the expectations of those the trail is designed to serve.

The goal is to design the height (rise) and depth (run) of the steps to match the level of challenge desired. Steps are harder to negotiate as the rise increases.

The components of a step are: the rise, the run, a landing on easier grades, and often retainer logs.

The rise is the vertical distance gained at the face of each step. The run is the distance from the edge of one step to the base of the next step's face. The landing is the extension of the run above the step. In structures

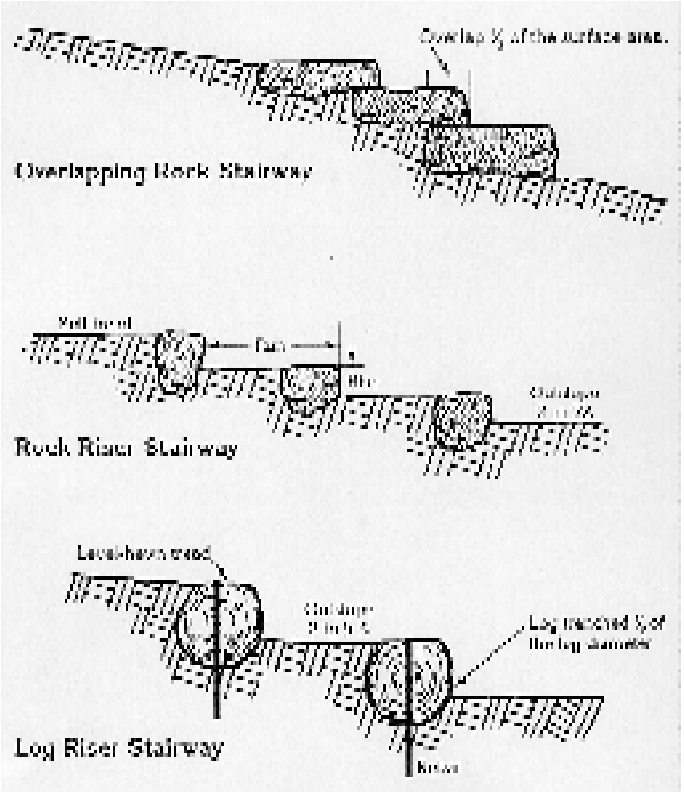


Figure 4-32: Types of Steps
[Trail Construction & Maintenance Notebook, USFS, p. 97-98]

Hikers, especially backpackers, generally don't like steps and will walk beside them if there is any opportunity. The steps need to be comfortable to climb or they won't be used. This means keeping the rise a reasonable 6 to 8 inches and the run long enough to hold a hiker's entire foot rather than just their toe. A general rule of thumb to keep in mind during step construction is that Atwice the riser plus the tread (run) should equal 25 to 27 inches.

If the stairway climbs straight up the hill, each step should be slightly crowned to drain water to the edges or slightly sloped to one side. When the trail traverses a slope, each step and landing should be slightly outsloped. Water should not be allowed to descend long lengths of a set of steps or to collect on or behind a step on the landing. A drain dip where the trail approaches the top step is a good idea.

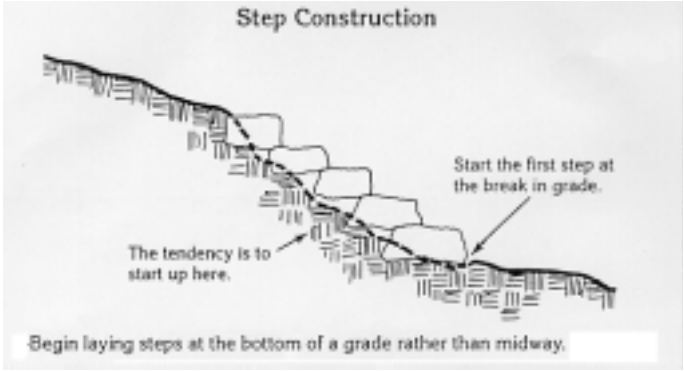


Figure 4-33: Step Construction
[Trail Construction & Maintenance Notebook, USFS, p. 99]

where the landing is composed of tamped fill material, retainer logs or stone cribbing are used to retain the fill.

Build stairways from the bottom up, at a break in the grade. The most common mistake is to start part way up a grade.

In all steps, the key is to use the largest material possible and to seat it as deeply as possible. Rocks should be massive and rectangular. On steps that traverse a slope, it helps to seat the upper end of the step material in footings excavated into the slope. Rocks placed alongside steps help keep users on the trail.

Support Structures

Wildlife Observation Structures-Viewing platforms or wildlife observation structures are being used increasingly with various trail systems.

Platforms can be used for watching wildlife and enjoying scenic vistas. These structures can provide a safe vantage point for trail users to enjoy vistas with minimal impact to the land.

Such platforms can have interpretive signs and viewing devices such as "pay per view" spotting scopes built in. Decks or platforms should have more complex shapes than simple rectangles. Deck shapes should bow outward from the running boardwalk in order to create an outward focus. To keep carpentry simpler, angles can optionally be kept to 45 degrees. The site and user circulation patterns should dictate deck designs.

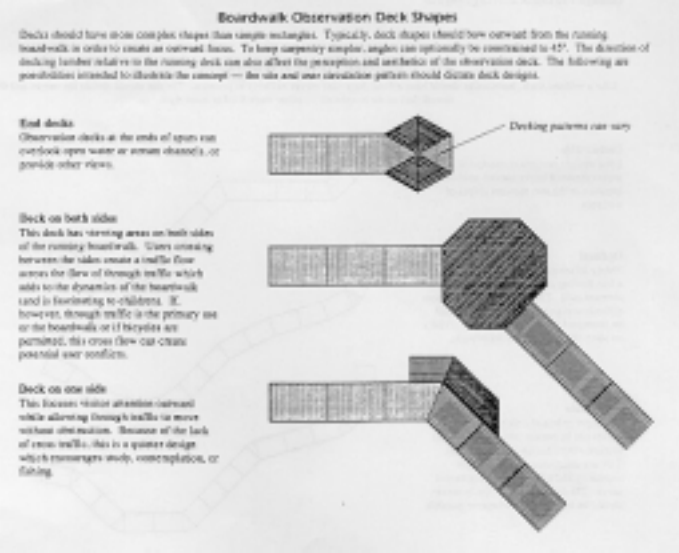


Figure 4-34: Boardwalk Observation Deck Shapes

[Trails Design & Management Handbook, CO, p. 2-102]

Vistas and Overlooks-Vistas and overlooks are natural or man-made openings providing a scenic view, and are often the purpose or destination of one's hike on a trail. The addition of a vista enhances an existing trail. Vistas must be maintained by periodic clearing (unless naturally occurring), and should not be created/ maintained at the expense of resource damage. A vegetative survey should be done prior to clearing to insure that no significant plant species would be removed or impacted, and any clearing must be within existing departmental guidelines or federal/state/local legislation (riparian buffers, CBPA, etc.).

The direction of decking lumber relative to the running deck can also affect the perception and aesthetics of the observation deck. The following are examples which illustrate this.

An overlook is created usually by installing railings or a platform with railings at a place highlighting the site's scenic beauty.

Safety of the visitor must be kept in mind in creating and maintaining vistas and overlooks,. Barriers such as a fence or railing, or vegetation may need to be installed or planted. Unwanted trails sometimes are created from the vista, and vegetative or other barriers can be put in place to discourage such use.

Benches-Benches may be placed at strategic points along a trail to provide resting and viewing opportunities. While there is no standard design for trail benches, benches within one park shall be of consistent design and construction. This adds to the overall aesthetic appearance of trail structures, and aids in maintenance and future installation. The placement of benches should not interfere with use of the trail, and as such, are typically placed in areas where clearing beyond the required trail width occurs. A sample bench design is found in Appendix XIX.

Kiosks-Kiosks, or bulletin boards, shall be placed at a minimum, at the major access point(s) to the trail system. This serves as an information center for trail users, and should display the trail system map(s), any pertinent user information and rules, and desired park specific information. In parks with specific or dedicated trails, such as equestrian or mountain biking trails, a kiosk should be installed at the main trail access point for those users. Where multiple use trails exist, user etiquette guidelines should be displayed.

While there is no standard design for kiosks, within one park kiosks shall be of consistent design and construction. This adds to the overall aesthetic appearance of trail structures, and aids in maintenance and future installation. Construction should be adequate to withstand the elements and visitor use. A sample kiosk design is found in Appendix XX.

Information and postings should be kept up to date. Trail map dispenser boxes may be attached to or located near the kiosks.

Kiosks can be a valuable tool in promoting safety, resource protection, and enhancing the user's overall experience on our trails.

Gates-Gates are critical to preventing unauthorized or undesirable to areas of the park and portions of trails that are off limits to the public. While there is no standard design for gates, within one park gates shall be of consistent design and construction. This adds to the overall aesthetic appearance of trail structures, andaids in maintenance and future installation. Construction should be adequate to withstand the elements and visitor use. A sample gate design is found in Appendix XXI.

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Specific Trail Types

This section focuses on the different specifications for different types of backcountry trails, such as biking, equestrian and multiple use. The standards and construction methods described in Basic Construction Standards above should be followed, but one should note differences in trail width, clearance or grade when developing a trail for a specific use. Each specific trail type is described, and followed with a table summarizing the construction guidelines.

Hiking Trails

Refer to the Basic Construction Standards of the previous section to compliment the special hiking standards of this section.

Trail Layout-All of the procedures outlined under Basic Construction Standards should be followed in the design and layout of hiking trails. Trails should follow contours, rather than go up or down hills or slopes. Take advantage of scenic vistas, or historical and natural resource management features. Loops are always preferred over "dead end" trails, which require users to backtrack along the same route. Avoid placing trails in areas that require structures due to hydric conditions, high erosion potential, or steep grade, as that not only increases the cost of construction, but the cost of maintenance. When structures are needed be sure to plan adequate approach space into the design of the trail.

Trail Width-The tread should be 2 feet wide for a single lane hiking trail, and 5 feet wide for a double lane hiking trail. "Single lane" and "double lane" are terms borrowed from mountain bike trail construction, with single lane implying a narrower, more rustic trail environment that does not lend itself well to 2-way traffic, and double lane implying a wider trail, conducive to 2-way traffic, and service vehicles. The horizontal clearance on either side of the trail tread should be 2 feet, creating a trail corridor ranging from 6 to 9 feet.

Vertical Clearance-Vertical clearance for hiking trails should extend 8 feet high from the tread. Keep in mind that branches above the pruning height, particularly from conifers, may drop down into cleared spaces over time, so additional vertical clearing may be in order at the time of new construction.

tread. Heavily used trails may require additional surface material to lessen the soil compaction and disturbance.

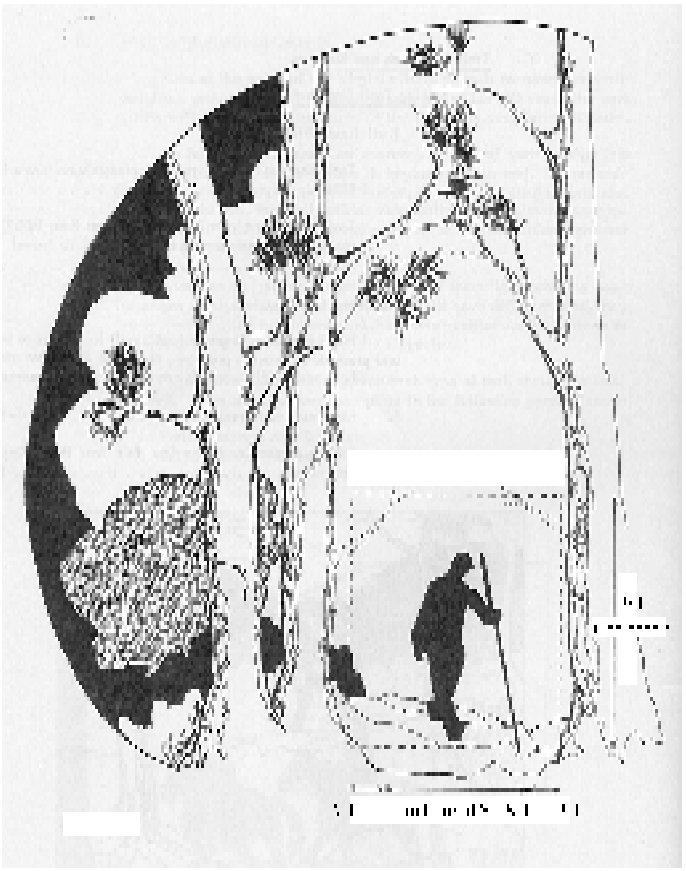

Figure 4-35: Hiking Trail Clearing Standards

Trail Surface-Natural surfaces should suffice for most hiking trails. An obstacle free surface is desired, requiring the removal of all roots and stumps from the

tread. Heavily used trails may require additional surface material to lessen the soil compaction and disturbance.

Wood chips and "crusher fines" (fine crushed gravel, such as aggregate no. 10/stone dust) are the preferred surface material for heavier used trails.

Trail Grade-The maximum sustained grade for hiking trails is 8 to 10 percent. Grades of more than 10 percent can present erosion problems and make hiking more difficult.

Construction Techniques-On slopes, build the tread a little wider than called for to allow for crumbling edges. The tread should be constructed to allow for water to flow downslope and off the trail. The downslope side of the trail may be reinforced with logs or stone. Remove any material on the uphill side of the trail that might fall onto the tread.

Component	Standard
Vertical Clearance	8 feet
Trail Width	2 feet single lane 5 feet double lane
Horizontal Clearance beyond trail width	2 feet
Grade	max. sust. 8-10%
Tread Surface	natural surface, compacted material

Table 4-1: Summary of Guidelines for Hiking Trails

Recreational Biking Trails

This section addresses the needs of the more traditional or recreational backcountry bike trails, as contrasted with mountain bike trails. Recreational biking trails typically are flatter, wider and can accommodate beginners as well as advanced cyclists.

Refer to the Basic Construction Standards in the previous chapter to compliment the special biking standards of this section.

Trail Layout-Recreational bicycle trails should be loop trails when possible, or a series of connector trails offering bicyclists opportunities for varied rides and trail experiences. Trails should be geared for the family group. Trails should accommodate two-way usage, and thus be double track, allowing multiple lanes for users.

Trail Width-Bicycle trails should be at least 4 feet wide, which provides for one-way (single lane) bike traffic, or where two-way (double lane) bike traffic is expected, 8 feet wide. The horizontal clearance on either side of the trail tread is 2 feet.

Vertical Clearance-A clearance of 8 feet should be maintained vertically for bicycle trails.

Trail Surface-Natural surfaces should suffice for most bike trails. A variety of grades of gravel may be used to supplement natural surfaces as soil and drainage needs dictate. A fine crushed gravel, such as stone dust (aggregate no.10) works well as it compacts to provide a fairly even surface, creates minimal noise when tread upon, and enhances drainage. Crush and run (aggregate no. 21) can also be used, but the noise production increases, which may be a negative factor in the overall trail experience. Larger gravel should be avoided. Various other surface material may work well depending

on the site conditions. Paved surfaces may be appropriate in certain sections of the park subject to heavy and varied (non-equestrian) use.

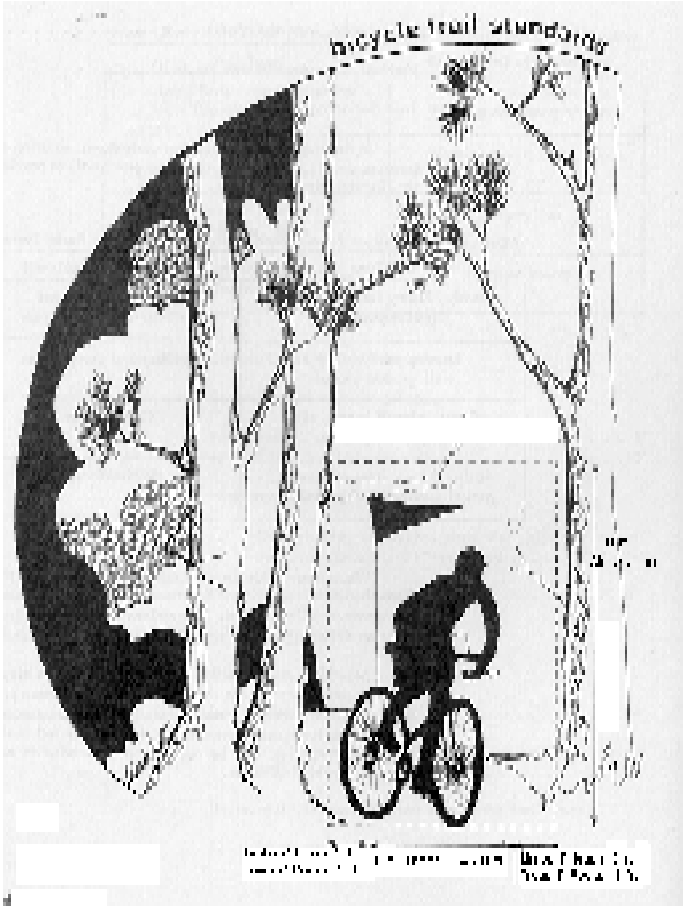

Figure 4-36: Bike Trail Clearing Standards

Trail Grades-The ideal sustained grade for bicycle trail is from 3 to 5 percent, with a maximum sustained grade of 8 to 10 percent acceptable. The grade should not exceed 10 percent.

Construction Techniques-For the most part, recreational bicycle trails should be planned such that the need for structures to enhance water drainage and tread can be avoided. If such structures are needed, the same techniques suggested for mountain bike trails can be adapted to recreational bicycle trails.

Component	Standard
Vertical Clearance	8 feet
Trail Width	4 feet single lane 8 feet double lane
Horizontal Clearance beyond Trail Width	2 feet
Grade	3 - 5 percent max. sust. 8-10%
Tread Surface	relatively smooth

Table 4-2: Summary of Guidelines for Recreational Bike Trails

References:

Virginia State Parks. (1977). The Construction and Maintenance of Trails. Richmond, Virginia

Mountain Biking Trails

In recent years, the introduction and tremendous popularity of the mountain bike has greatly changed the demand for bike trails, as well as the recreational sport of bicycling. With the increase in popularity of the mountain bike comes an increased demand for opportunities to ride on roads and trails. The influx of mountain bikes has created new demands on resources and can give rise to increased conflict among trails users. With appropriate planning, construction or conversion, and making available clear user information, the addition of mountain bike trails can provide tremendous opportunity for park exploration and challenging trail rides, and introduce an entire new user group to the park.

Refer to the Basic Construction Standards above to compliment the specific mountain biking standards of this section. Note that some of the techniques described in this section may not be suitable if equestrians are sharing the trail.

Trail Layout-Single track trails are trails where the width of the trail only allows for one "lane" of users. Passing may only occur if one user pulls off the trail to allow another user to pass. Most mountain bicyclists prefer single track trails. Single track trails should be looped and in most instances, posted "one way". **Double track trails** allow multiple lanes of users, or provide for passes without one user having to yield the trail. The reference to mountain bike trails in this manual will assume single track construction.

Mountain bike trail systems should form multiple **loops**. The most successful trails are stacked loop and maze trials that have 10 to 100 miles of interconnecting loops; however, in Virginia, loops of less mileage are also accepted due to the relative scarcity of mountain bike trails. Bikers can design their own ride and choose the distance they want to travel. When planning stacked loop trails, loops should progress from the easiest routes to the most difficult. Be careful not to "over-trail" an area with numerous short loops. Bicyclists enjoy longer, open loops with occasional options for shorter loops.

One-way directional trail use may be desired for a variety of reasons, including safety considerations and impacts to the trail in a particular uphill or down hill setting. Some users resent the limitation of one-way directional signage. One way direction may be achieved without signing the trail via the layout by designing the entrance trail as angled gently to the right and the exit trail tying back in on the left at greater than a 90 degree angle. With this design most users will circle the loop to the right. This trail design encourages, rather than demands a specific traffic flow.

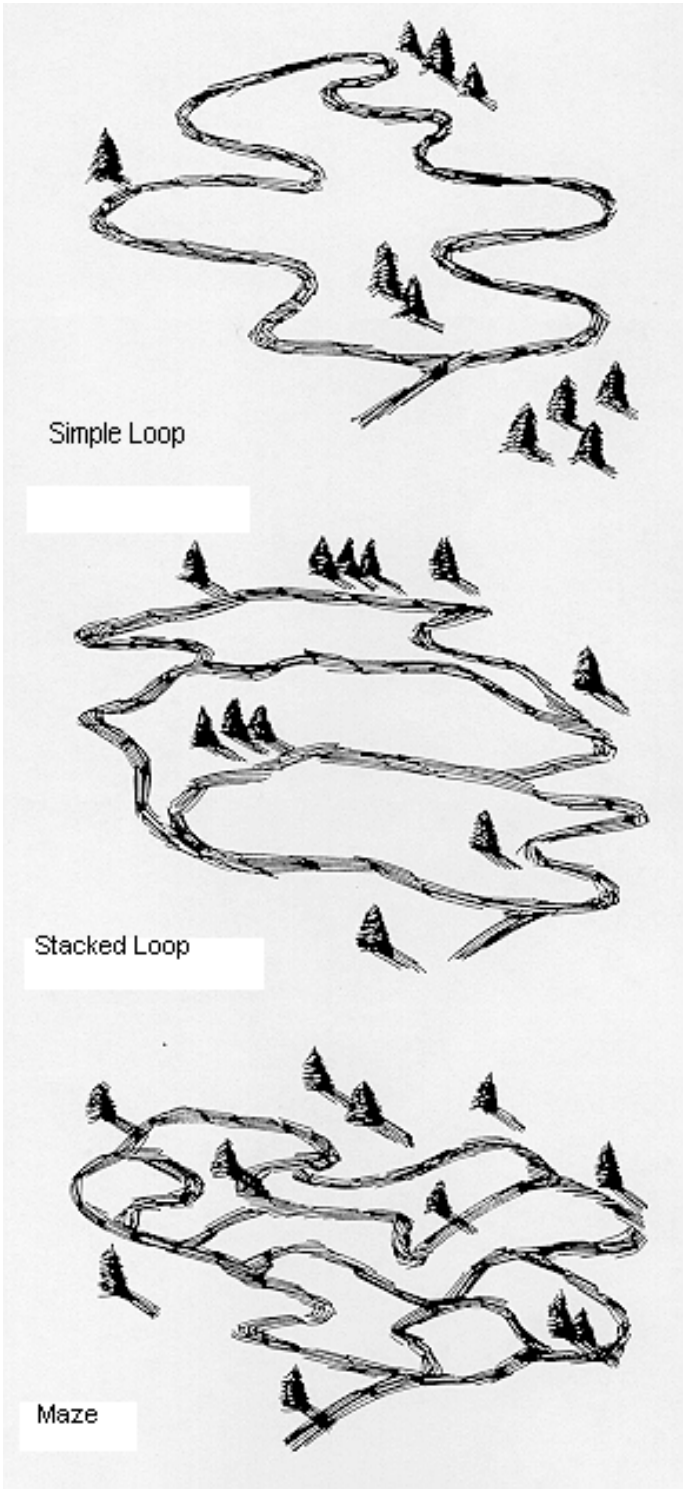

Figure 4-37: Loop Trail Designs
[Mountain Bike Trails: Techniques for Design, Construction, Maintenance, p.2]

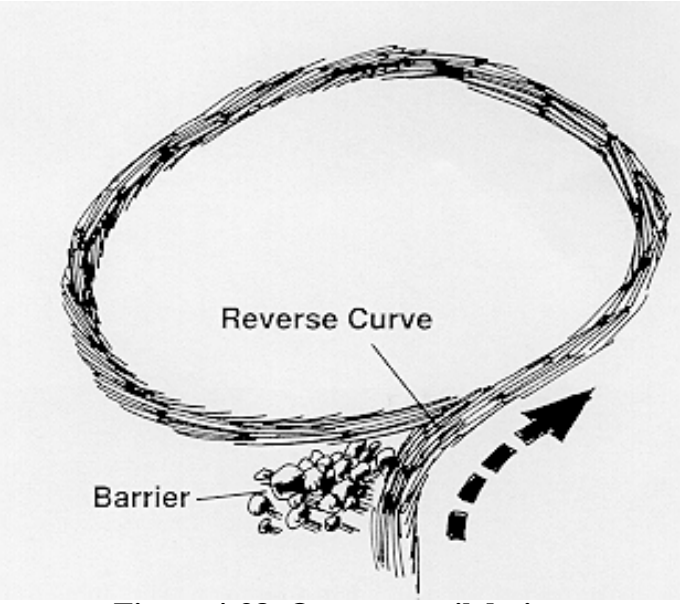

Figure 4-38: One way trail design
[Mt. Bike Trails: Techniques for Design, Construction & Maintenance, p. 3]

Sight Distances-Appropriate sight distance is quite important in the design of a mountain bike trail. While an ideal mountain bike trail includes turns and bends, it is important to note that most bicyclists will want to travel more slowly and apply the brakes when encountering the turns and bends. Brakes applied consistently and more gently, which occurs in turns and bends that allow greater sight distance and are not sharp sudden turns, have less resource impacts than locking the brakes, which will occur when bicyclists encounter sudden, tight turns preceded by long straight sections of trail.

Trail Width-A single lane (track) trail should be cleared 6 feet. For two way or double track passage, clearing should be 9 feet. The tread itself must be 2 feet for single track, and 5 feet for double track.

Vertical Clearance-Trails should be cleared at least 8 feet above the tread.

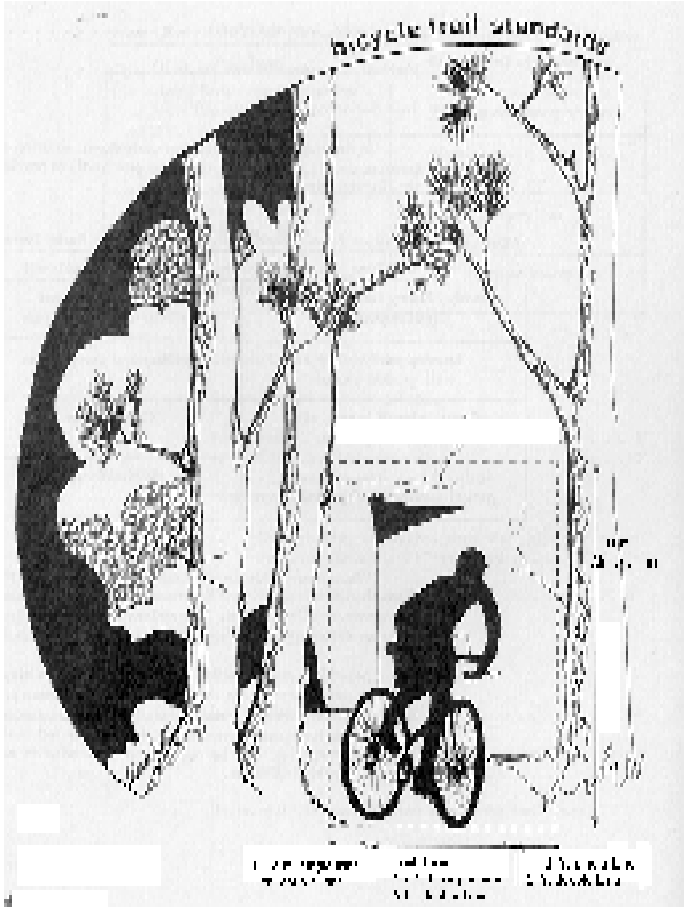

Figure 4-39: Mountain Bike Clearing Standards

Trail Surface-While a trail surface free of barriers is typically desired, a clear, smooth surface on a mountain bike trail allows bicyclists to confidently increase their speed, and in some cases, this can be a problem. Leaving a slightly rougher, natural surface may encourage a slower ride. Also, many bicyclists are seeking technical trail riding, and rough surfaces can provide that challenge. Roots, bumps, downed trees, and even gravel can contribute effectively to a desired trail surface. Information about the hazards associated with mountain bike trail riding can be provided at trailheads and in trail guides.

Soil type and changing weather conditions can significantly affect the trail surface. The surface and difficulty level may change in different weather

conditions, and the impact to the resource may also change. Be sure to consider the soil type for erosion-prone and impact-resistant soils in selecting the trail course.

Trail Grade-Grade is the slope maintained by the trail in its direction of travel. When possible, avoid long, steep downhill grades on mountain bike trails, which often cause bicyclists to lock their brakes and skid. Rocks and soil may be displaced and resource impacts can occur. Safety concerns can arise on downhill sections of trail, since speed is usually increased.

The maximum sustained grade should not exceed 10 percent over a maximum distance of 300 feet for trails of moderate difficulty. The sustained grade should not exceed 5 percent over a length of 100 feet for "easier" trails. A maximum pitch, or the highest percent of grade found anywhere on the trail, should not exceed 30 percent for moderately difficult trails, and 10 percent for easier trails.

Approaches to intersections should be kept to under 5 percent to minimize user conflicts and resource impacts caused by sudden braking or skidding.

On poorly drained soils, the bicycle wheels may form ruts. These ruts on steep slopes channel water down-slope, causing the ruts to grow larger, and increase the rate of erosion. This can be minimized by locating trails across the slope rather than straight up and down the fall line, and when needed, installing water control structures.

Construction Techniques-Through careful planning, environmental damage and user conflicts can be kept to a minimum. The application of proper construction techniques can help managers provide safe, enjoyable

Component	**Standard**
Vertical Clearance	8 feet
Trail Width	2 feet single lane 5 feet double lane
Horizontal Clearance beyond Trail Width	2 feet
Grade	max. pitch *easiest* 10% *more difficult* 30% max. sust. grade *easiest* 5% over 100 feet *more difficult* 10% over 300 feet
Tread Surface	relatively smooth, with sections of rough surface

Table 4-3: Summary of Guidelines for Mountain Bike Trails

trail systems. The basic trail construction and maintenance standards can be supplemented with the following techniques specific for mountain bike trails (refer to those sections for complete explanations of various techniques and methods).

Mountain bikers tend to ride on the outer edge of the tread to keep their inside pedal from scraping the back slope. When practical, select **full bench** trail construction rather than three-quarter of half-bench construction. In areas where a cut and fill technique is used, the fill dirt may not make suitable tread, leading to trail erosion.

Sloping the trail to the outer side on low grades will permit the water to run off. Even though bicyclists may

tend to veer toward the outside of the trail where **outsloping** has been constructed, it has not led to significant safety problems.

On tight **switchback turns**, bicyclists may skid and/or swing wide in order to negotiate the turn. This can lead to increased erosion on the outer corner of the turn. If the outside of the turn is upslope, an arched erosion site may develop. If bicyclists lock their brakes to negotiate downhill turns, their rear wheel sweeps around the corner, causing sheet erosion. While managers may employ techniques such as leaving vegetation close to the edge of the trail or lining the edge of the trail with rocks or logs to discourage "swinging", or leaving a rough tread on downhill switchback turns to reduce the speed of the bicyclist, it is preferred to increase the sight distance and/or create more gradual turns.

The **climbing turn** has a more gradual curve with a wider turning radius than the switchback turn. This allows riders to go through the turn with minimal skidding or braking. The climbing turn accommodates the tendency for the bicyclist to swing wide as they ride through the turn, lessening the arched erosion or sheeting erosion problems that one encounters with switchback. Be aware that bicyclists are able to travel faster through climbing turns, and determine whether the switchback or climbing turn works best given the type and volume of users and the potential resource impacts to the site.

The **crib wall** is a stone or timber wall and can be used in conjunction with switchbacks. The crib wall is constructed on the upper trail of the switchback on the outside edge.

Water Control Structures-Collector ditches are hazardous to mountain bikers. If ditches cannot be moved away from the edge of the trail or feathered in from the trail, do not use them, and employ other satisfactory drainage techniques.

Grade dips are relatively safe for use on mountain bike trails, since they do not have rocks, logs or a drop-off in their structure. Grade dips should be incorporated in the initial construction of the trail. They blend in well with the trail, are effective in removing water, are low maintenance, and bicyclists do not tend to ride around them.

Check dams are hazardous to mountain bikers. The sudden drop-off/step-up associated with check dams may throw or destabilize bicyclists as they attempt to ride into them. Bicyclists would choose to ride around the dams, creating alternate routes that channel water around the structure, rendering the check dam ineffective.

The small drop-off and slippery rocks or logs associated with **water bars** can destabilize bicyclists when they ride over these structures, potentially causing the bicyclists to ride around them. Use grade dips, rather than water bars, in new construction. In reconstruction, use the double sunken log structure or a grade dip, rather than the conventional water bars.

The **rolling grade dip** is an adaptation of the dirt water bar. It requires minimal maintenance, does not cause falls (like the traditional water bar), and has minimal aesthetic impact to the trail. Dig a 5 to 6 foot long "spoon" or dip no more than 5 or 6 inches into the tread. The entire downhill side of the dip is opened up for drainage. This promotes high volume drainage with very low water velocity. Take the excavated soil and create a slight hump at the lower end of the dip no more

than six to eight inches tall. Think of the part of a spoon where the handle joins the main part of the spoon. There should be a smooth, consistent transition from the center of the dip to the top of the hump—no sharp edges or steep humps. Next complete the "handle" of the spoon by building a ramp that extends 8 to 10 feet down the trail from the hump. The hump and handle should be built in layers. Pack each layer with a McLeod or some other large surface packing device before piling on more dirt. Pack the entire structure and remove any divots or bumps, making it as smooth as possible. If you must build the hump taller than described due to steeper slopes, use the following guideline—for every inch you increase the hump add one foot to the length of the ramp (the handle). Apply the same to the "dish" of the spoon—if you dig it in deeper, it should be longer. This will keep the structure smooth and stable.

The **double sunken log** structure is another adaptation of a water bar. Two logs are buried at a 45 to 90 degree angle to the trail with 6 to 8 inches between them. The uphill log is level with the trail surface and the downhill log is a bit higher than the surface. Water flows over the first log and into the drain between the two logs, which then carries the water off the trail. Both logs are buried such that bicycle wheels do not slip on them.

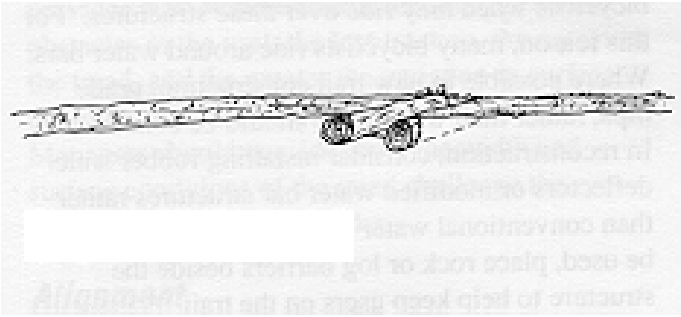

Figure 4-40: Double Sunken Log
[Mt. Bike Trails: Techniques for Design, Construction, Maintenance, p.10]

Trail Surfacing- Where appropriate, leave a **rougher surface** with rocks and roots and other natural or human-made barriers in place to help slow riders speed, and provide the challenge many riders want. A clean, smooth surface allows bicyclists to increase their speed, which may intensify resource impacts and user conflicts.

In wet areas, **aggregate or gravel surface** can be used for erosion protection and to slow the bicyclist's speed. Be sure to allow adequate visibility in advance of such a change in the trail surface, so that cyclists can see and prepare for the change.

In wet areas or along trails along level terrain, the tread surface can be **crowned** slightly above the ground level to minimize resource impacts. Cyclists may tend to ride along the graded slope, which will cause problems, but through posting explanations of the reason for the crowned tread and why cyclists should ride in the center, most will comply.

Geosynthetics are synthetic materials used with soil or rock in a variety of construction efforts. They include geotextiles, geonets, sheet drains, geogrids, and geocells. The materials become a permanent part of the trail, but must be covered with soil or rock. Geosynthetics perform three functions: separation, reinforcement, and drainage. The geosynthetics provide a stable trail surface in wet areas by assisting in allowing water but not soil to pass through, improving the subsurface drainage to avoid saturation and weakening of the trail tread, and reinforce the tread and provide load distribution over the trail tread. They are essentially fabric mats that increase the strength of the trail cross section, especially where soft or unstable soils exist. They can improve the integrity of the sub-base by preventing the migration of soil.

Tread Structures-When using **puncheon planks** for bicycle trails, the planks must be spaced no wider than one inch apart. Wet or frost-covered planks can be hazardous, so warning signs must be posted at trailheads or crossings. Planks on the running surface of the puncheon must not be aligned parallel to the trail, as this can cause bicycle tires to be trapped.

As in puncheon, **bridges and boardwalks** can be hazardous when covered with frost, or even wet. Some cyclists may be intimidated by riding on a narrow structure. Wheel guards placed along the edges of the structures can act as bumpers to prevent bicyclists from slipping off the edge, and enhance the cyclists confidence in crossing the structure. If handrails are used, there should be a minimum width of 4 feet between them, and brush should be kept clear, so the handrails can clearly be seen. Approaches must be straight and level. Vinyl coated chicken wire can be used as a traction aid. It should be attached to the deck surface by wire staples and the edges held down by 1 X 2 inch planks.

Control Measures-Bicyclists tend to ride on the outside edge of the trail to prevent their pedal from scraping against the backslope. Rock or log **trail edge barriers** can be placed along the outside edge of the trail to keep the edge from eroding. Be sure to allow adequate tread width for safe passage, and allow adequate space between barriers for proper drainage.

In a **stream crossing**, the main thoroughfare should be left clear for bicyclists to ride through the crossing; free of rocks. The stream bottom should be stone to keep sediment disruption to a minimum.

Excessive **trail clearing** may encourage bicyclists to leave the tread when cornering or to pass. Narrow the clearing width by leaving brush close to the trail's edge, but be sure to remove overhanging vegetation or projecting tree limbs for safety.

Level of Difficulty-In constructing single track mountain bike trails, managers should ensure that there are opportunities for various levels of rider. If the only mountain bike course offered in the park is an advanced, challenging course, chances are that despite signage to that effect, many novice riders will attempt the trail, leading to numerous accidents and injuries. Try to offer opportunities for all levels. Be sure that users are informed of the difficulty level of the trail via signs or postings on kiosks at the trailhead.

Special Considerations-Providing appropriate and positive information to trail users is important in encouraging responsible trail use as well as to gain partners in the long-term trail maintenance and park support. Strategically placed kiosks that contain current and useful information can become a valuable tool for conveying important information to the trail users. The mountain biking community through the IMBA has published several "Rules of the Trail" flyers and brochures that encourage environmentally sound and socially responsible cycling. See Appendix XVII for samples of these flyers and informational postings.

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Equestrian Trails

Equestrian (horseback) trails pose several issues that are unique to the needs, physiology, and habits of horses. Before describing the standards, some background information on horse mental and physical characteristics is presented to aid trail planners and managers in understanding equestrian needs.

Please note that references for equestrian trails refer to mounted horseback riders. While there is a demand for trails that can accommodate horse-drawn vehicles (carriages), these are more easily compared to roadways, and trail development for this kind of traffic is not considered in this document.

The modern trail horse is strictly a product of domestication. In the wild, horses are herd animals that are heavily dependent on a strict order of leadership. Horses are prey items in the food chain, and display the "fight or flight" response when posed with a threat. Of primary importance to the health and fitness of the horse are feet, hooves and lower legs.

In Virginia, there are over 225,000 horses that provide over 25,000 full time jobs (1995 Virginia Horse Industry Profile, by the Virginia Equine Education Foundation, Inc.). The number one use of the horse in Virginia is recreational trail riding. With private landowners becoming more and more concerned about liability, the demand for public access bridle trails is increasing.

Liability is indeed a concern when developing any trail. The Code of Virginia, CH27.5, Sect 3.1-796.130-133, also know as the Equine Activity Liability Act, offers some guarded protection against liability to equine activity sponsors providing that they are not negligent. A copy of the Equine Activity Liability Act can be found in the Appendix XII.

Refer to the Basic Construction Standards earlier in this section to compliment the specific equestrian trail standards of this section.

Trail Layout-All of the procedures outlined under basic construction standards should be followed, and the specifications for equestrian trail construction kept in mind in the trail design. Trails should be located a safe distance away from existing trails when possible, especially mountain biking trails, except where a multiple use trail that accommodates bikers, hikers and equestrians is planned. When trails are in close proximity, strive to minimize potential conflicts by carefully assessing the type of use and user on the trails. In planning the layout of the trail, keep in mind that horses not only can be startled by visual stimuli (bikes quickly riding by on a parallel trail or trail crossing), but by aural stimuli—a bicyclist may be hidden

fromview by vegetative screening, but the sound of the bike may startle the horse.

Once equestrian trails are established within a park, it is important that trails not intended for equestrian use be labeled as such, to prevent exploration onto trails and structures that may not be constructed adequately for equestrian use.

Trail Width-Equestrian trails should be at least 4 feet wide, which provides for one-way (single lane) traffic, or where two-way (double lane) traffic is expected, 8 feet wide. The horizontal clearance on either side of the trail tread is 2 feet.

Vertical Clearance-Clearance above the trail should be a minimum of 10 feet.

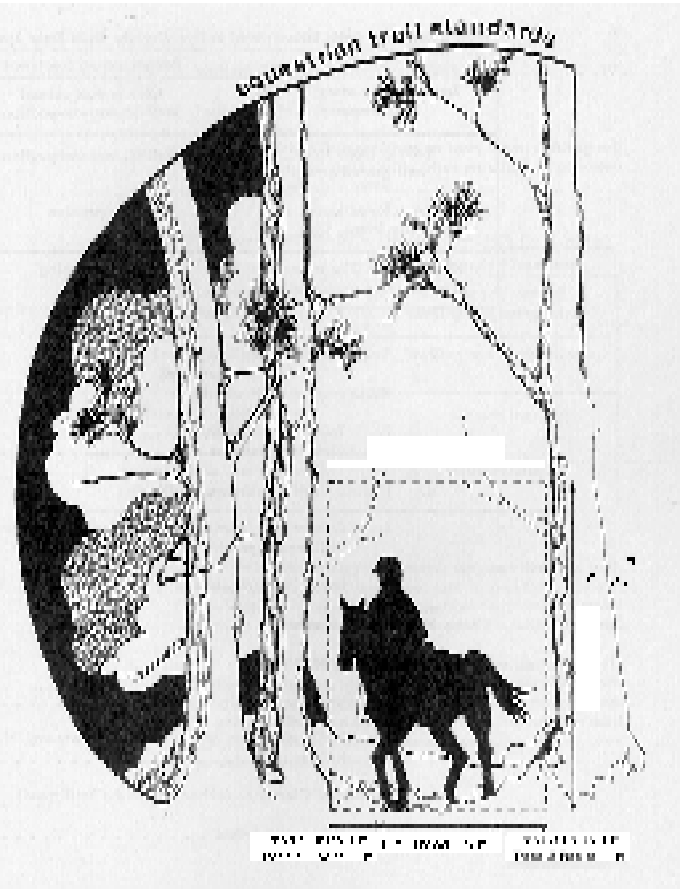

Figure 4-41: Equestrian Trail Clearing Standards

Trail Surface-The trail surface should be usable when wet and not dusty when dry. The surface should

be resistant to normal use and erosion and composed of compacted materials. The earthen forest floor, or natural soils in an open field usually serve well as trail surface material with routine maintenance to address ruts, holes or drainage problems. Where additional materials are desired to minimize erosionor severe compaction and wear to the trail, mulch, wood chips, fine gravel such as stone dust, or other similar materials work well. Keep in mind that equestrians typically dislike aggregate stone surface. All vegetation must be cut off at or below ground level.

Trail Grade-More than a 10 percent grade is difficult for both horse and hiker to maintain and can contribute to erosion problems, which will require the installation of water bars and other structures. The maximum sustained grade should be 8 - 10 percent.

Construction Techniques-Bridges and other crossings must be sound, solid and able to accommodate the weight of the animal (800 pounds minimum). Nails, screws, or bolts are set flush, and no loose or widely spaced boards are present. Where possible, side rails of at least 2 feet should be attached to each side of the bridge. Boards for bridges should butt against one another.

Steps should not exceed 6 inches of rise over 36 inches of run.

The narrower and more “closed in” a trail is, there is more likelihood of a horse spooking at close distances. Allow adequate (50 feet) field of vision in front, to the rear, and around curves. Make turns and curves as wide and sweeping as possible.

Levels of Difficulty-It is important to note that since a horse is a living creature and not a machine or piece of equipment, it is the combined ability of the horse and rider, as well as the familiarity of the horse with the rider and vice versa, that determines the performance ability of the team. It is important that park staff adequately sign trails and alert riders to the presence of bridges, bike trail crossings and other potential surprises. If a trail contains bridges, an alternate trail route should be offered so that riders on horses that are not accustomed to crossing bridges have a choice.

Special Considerations-Shoes should be recommended for all equestrian trails. In conditions of extremely rough or overgrown conditions, pads should be recommended. All horses should have a current (within 12 months) negative Coggins (equine infectious anemia) certificate. An honor system shall be set up with a book for riders to log their Coggins certificate number and date. See Appendix XII for additional information and implied management responsibilities as a result of Virginia Regulation VR 115-02-05 ("Rules and Regulations Pertaining to the Health Requirements Governing the control of Equine Infectious Anemia in Virginia").

At some sites, horse camping opportunities may be offered, in conjunction with horse trails. See Appendix L for additional information for and about low impact horse camping and trail etiquette.

Equestrian trails require additional support structures such as staging areas, water, manure disposal, as well as adequate parking and maneuvering space for trailers.

References

Arkansas State Parks. Construction and Maintenance of Horse Trails.

Virginia Equine Educational Foundation, Inc. (1995). Virginia Horse Industry Profile.

Virginia State Parks. (1977). Construction and Maintenance of Trails. Richmond, VA.

Component	Standard
Vertical Clearance	10 feet
Trail Width	4 feet single lane 8 feet double lane
Horizontal Clearance beyond Trail Width	2 feet
Grade	Max. sust. 8 -10%
Tread Surface	Natural surface, free of holes, ruts; fine or compacted material

Table 4-4: Summary of Guidelines for Equestrian Trails

Connector Trails

Connector trails are defined as paths, walkways or trails which provide access to facilities, resources, and other trails, either within the park or on adjacent lands. These trails may also be called Outdoor Recreation Access Routes, under proposed (1999) accessibility guidelines.

Internal Connector Trails-Internal Connector Trails are generally heavily used walkways or trails, within

developed areas of the park, which serve as a means of circulation to and from facilities and recreational offerings. Internal Connectors should be constructed using the guidelines found in various chapters of this manual. Emphasis should be placed on a hard surface to promote visitor safety, accessibility and resource protection.

External Connector Trails-External Connector Trails cross park boundaries into adjacent federal, state, local, or private lands. These trails expand resource conservation corridors, provide additional opportunities for trail users, promote a nationwide trail system, and provide alternative routes for transportation. Construction of External Connectors should be carefully coordinated with the adjacent land owner to ensure agreement with construction and maintenance guidelines, management strategies, use patterns and regulations. This agreement shall be addressed in a formal "memorandum of understanding." Trail construction standards should conform, as closely as possible, to the standards which are mentioned in this manual.

References

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Multiple Use Trails

A multiple use trail, also referred to as shared use, mutual use or diversified trail, is any trail that is used by more than one user group for more than one trail activity. Multiple use trails are growing in popularity and acceptance, if for no other reason, than limited land availability for trail development.

Where possible, Virginia State Park trail managers shall provide separate single use trails.

However, when faced with increased demands of different users and limited resources, the option of designating appropriate existing single use trails as multiple use trails is acceptable and can quickly meet user demands.

User conflict will occur with any multiple use trail. Proper planning and management can minimize the conflict. However, managing multiple users is a dynamic situation. As the number of users grow and the types of trail activities increase on multiple use trails, conflicts will likely increase or change. Minimizing and resolving conflict becomes an important part of multiple use trail management.

For the purpose of this manual, the focus will be on multiple use trails in a typical state park, or backcountry, setting. A lot of literature is available for the development and construction of urban multiple use trails, which tend to be part of, or parallel to, existing roadways or as part of an urban greenway development. In many cases, literature recommends the development of an 8 to 10 foot wide hard surface trail with a parallel, yet separate, soft surface, to accommodate a variety of users, both recreational and commuter. That type of development is beyond the scope of this manual, and beyond what is needed in the majority of state parks. Rail-trails are

also a multiple use trail, but issues relevant to that topic are covered in the next chapter.

Refer to the Basic Construction Standards earlier in this section to compliment the special standards for multiple use trails in this section.

Trail Layout-With multiple use trails, especially those with equestrian use, line of sight is an important factor in laying out and constructing the trail. A poor line of sight can lead to significant startling of other users. Startling can lead to, at the least, an unpleasant experience, and at the worst, an injury. Good design, coupled with user information and education on trail courtesy, etiquette and user right of way, will minimize the opportunities for startling.

Sight distances should increase as the speed, tread width and surface quality increase. Conversely, as the surface quality and tread width decrease so will the speed and the need for increased sight distance.

Type of User	Adequate Stopping Sight Distance (+/- 25 feet)
Bicyclist	150 feet
Equestrian	100 feet

Table 4-5: Sight Distance Requirements for Stopping

Trail Width-Refer to the standards for hiking, biking, mountain biking and equestrian trails, depending on the desired use. The minimum width of a multiple use trail should accommodate the greater requirements of the standards for the desired type of use. In general, soft surface multiple use trails should be 8 feet wide, with horizontal corridor clearance extending a few feet beyond that. In some cases, where heavy use is anticipated a 10 feet width would be appropriate.

There are many variables to consider in the design of a multiple use trail that affect the minimum width requirements, including type of user, the projected amount of use and projected combination of users at any one time or the peak time. As stated previously, much of the literature that exists in designing multiple-use trails takes a more urban, heavy use approach than will be required for many of our state park trails. For comparison purposes the following table is included, summarizing recommended trail widths for different levels of multiple use trails. The table is taken from the Rails to Trails Conservancy's *Trails for the Twenty-First Century*, with an additional column listing our standards for rural backcountry multiple use trail widths.

Use Groups	Urban	Suburban	Rural	DCR Backcountry
All non-motorized users	14 feet	12 feet	10 feet	8 feet 10 feet if heavy use
All non-motorized users, except equestrian	12 feet	10 feet	8 feet	8 feet 10 feet if heavy use

Table 4-6: Multiple-Use Trail Widths

Vertical Clearance-The vertical clearance should be 10 feet. If the multiple use trail does not include equestrians, the vertical clearance can be limited to 8 feet.

Trail Surface-The preferred surface material for a typical state park multiple use trail would be a natural "soft" surface, or a granular stone (crushed stone) "hard" surface.

A soft surface may not be suitable for the heavier traffic and use that may occur on a multiple use trail. The trail surfacing can be used to encourage or discourage use. A hard surface encourages use, where a softer surface limits the use of the trail to fewer user groups. The speed of travel can also be controlled, most obviously for bicycle use, with the softer surface slowing the speed of the user. As with all trail surfaces, factors such as the availability, cost, life expectancy and user acceptance of a desired material also contribute to the choice of a material for a multiple use trail surface.

Hard surfaces available include soil cement, granular stone, asphaltic concrete and concrete.

Asphalt and concrete are undesirable for equestrians, causing injury to the horse's hooves. If asphalt and concrete are used, a parallel or shoulder soft tread should be included to accommodate equestrians.

Of the hard surfaces, the **granular stone** accommodates a wide variety of users including hikers, bikers, and equestrians, where the other hard surfaces limit the range of users. Granular stone, if kept to a minimum of 3/8 inch diameter stone, also works well for wheelchairs. Limestone, sandstone and crushed rock are types of granular stone. If crushed to a very fine material and densely compacted, they hold up well under heavy use and seem less intrusive to the natural environment than asphalt or concrete. Ideally, stone should be at least 4 inches thick and put down over a prepared subgrade and compacted. Crushed stone should last 7 to 10 years, although spot repairs or grading will occur within that period.

Asphalt may be appropriate on non-equestrian multiple use trails, and more readily accommodates users such as strollers and skaters, as well as hikers and bikers. Specifications for asphalt surfaces may be found in the Rails to Trails Conservancy's *Trails for the 21st Century,* and DCR's Design and Construction section.

Crushed stone, or "crusher fines" provide for unconditional use by hikers, walkers, joggers and runners. They offer conditional use by equestrians, mountain bikers, road bikers, and nordic skiers. In areas of snowfall, plowing should be restricted from trails surfaced with crushed stone.

Crushed stone can be used on trails intended for the physically challenged, but due to the soft nature, the trails can not then be considered fully accessible.

Soft surfaces include a natural surface and wood chips. Soft surfaces work well in rural areas and serve equestrians, hikers, and runners well. Utilizing the natural surface requires the removal of rock and tree roots, and requires a properly sloped and well drained surface. There is less preparation to the trail bed. Wood chips blend well with the natural environment and serve hikers, runners and equestrians well, but decompose rapidly under prolonged exposure to the elements. Also, regular maintenance is required to keep the width of the trail constant. Wood chips should be installed at a depth of 3 inches and need replacing every 2 years. Over time, wood chips will build up humus

(decomposed chips), and thus retain more water leading to a wetter, slippery treadway.

Trail Grade-Refer to the standards for hiking, biking, mountain biking and equestrian trails. The maximum sustained grade should accommodate the greater requirement of the standards for the desired type of use.

Construction Techniques-Refer to the standards for hiking, biking, mountain biking and equestrian trails, especially with respect to structure construction. Keep in mind the variety of users and special needs. For example, to cross water, equestrians would prefer a simple water crossing, as horses easily negotiate steep slopes and graveled stream beds, and shy away from bridges. If a bridge is the only option, provide mounting blocks or space at the ends of the bridges so riders can dismount and lead their horses across (and should be encouraged to do so, versus riding across).

Level of Difficulty-Multiple use trails should typically be constructed for an "easy" level within the difficulty rating system, to accommodate the most users. If sections of the trail have greater grades or structures that increase the level of difficulty, an option of an easier route should be given users. The line of sight requirement to minimize the startling of horses is important to keep in mind.

Special Considerations-To resolve and minimize user conflicts:

1) Provide adequate trail opportunities: offer adequate mileage and opportunities for a variety of trail experiences

2) Minimize the number of contacts in problem areas

3) Involve users

4) Understand user needs

5) Identify the actual source of conflicts

6) Work with the affected users

7) Promote trail etiquette

8) Encourage positive interaction with different user groups

9) Monitor progress of conflict resolution efforts

For additional information on managing multiple use trail conflict see Appendix XIII.

There are many versions of appropriate "rules of the trail" that have been adapted by several parks over the years. While most are quite similar, for consistency and uniformity, the following shall be used by all parks.

1) Bicyclists yield to equestrians and hikers

2) Hikers yield to equestrians

3) All users should allow for passing.

The IMBA has developed and promoted signs, brochures and fliers entitled "Multiple Use Trail Guidelines." This basic information should be incorporated into all information available about specific multiple use trails, and a version of the sign may be obtained through the Logistics Support Center through the normal sign requisition process. See also Appendix XVII.

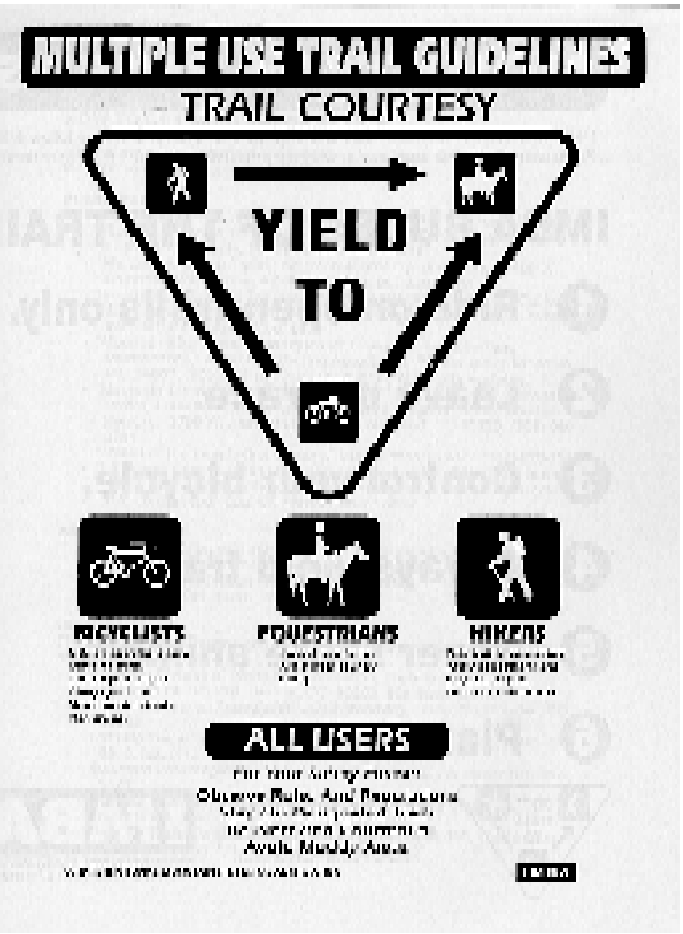

Figure 4-42: Multiple Use Trail Etiquette Sign
[International Mountain Biking Association]

References

Parker, Troy Scott. Open Space and Trails Program, Pitkin County, Colorado. (1993). Trails Design and Management Planning Handbook. Pitkin County , Colorado.

Ryan, Karen-Lee, Charles A. Flink, Peter Lagerwey, Diana Balmori & Robert M. Searns (Eds.). Rails to Trails Conservancy. (1993). Trails for the 21st Century, Planning, Design, and Management Manual for Multi-Use Trails. Washington, D.C.: Island Press.

Rail-Trail

As thousands of miles of abandoned railroad corridors, former canals, and other unused transportation routes are being converted into multiple use trails nationwide, it is important to recognize their unique qualities and available opportunities. These linear corridors are generally flat and frequently run along rivers and streams. Because of the continuous, linear nature of these corridors, they link abundant resources to each other. The conversion of these abandoned travel routes not only provide an extensive and irreplaceable corridor through diverse landscapes, but also preserves a significant portion of this country's heritage.

This section within this manual is a general overview of rail-trails. Each potential site has many unique characteristics and/or needs. For additional and specific construction details of a successful rail-trail, see the New River Trail Development and Management Plan, and other DSP guidelines on rail-trail construction (under development). Rail-trails are usually multiple use. Where possible, provide for a parallel but separate equestrian trail, particularly when the tread is paved—it saves the treadway and is easier on the horse's hooves.

Trail Layout-The design and management of these abandoned railroad corridors must consider the needs of different user groups as well as those of the various communities and diverse landscapes through which the trail passes. In most cases, the actual layout of the trail is predetermined by the railroad corridor. A thorough scouting of the course of the corridor shall be undertaken following acquisition to identify areas of concern, including hazardous waste sites sometimes found along old railroad right-of- ways.

Trail Width-The travelway or trail corridor should be approximately 14 feet wide. The average tread should

be 8 to 9 feet to allow for two-way, single-file traffic. Occasional wider areas, up to 11 feet, can be provided for passing.

Vertical Clearance-The travelway or trail corridor should be 10 feet high to accommodate horseback riders.

Trail Surface-There are many surface types available for completing the trail tread. Surface materials are either soft or hard, defined by the material's ability to absorb or repel moisture. Hard surfaces include soil cement, crushed stone, asphalt, and concrete. Soft surfaces include natural earth and wood chips. Soft surfaces often do not hold up well under heavy use or varying weather conditions, and are therefore not ideal for multiple use trails, particularly if substantial use is anticipated. Hard surfaced materials are more practical for multiple use trails. The hard surface materials tend to be more expensive to purchase and install but require less maintenance and can withstand frequent use. Hard surfaces also accommodate the widest range of trail users.

When selecting a surface material, it is important to consider the existing surface material, the needs of the intended user groups, and the desired condition/ appearance of the trail. The availability and cost of replacement materials should be considered as well when selecting the final surface material.

Construction Techniques-An assumption is made that all rail trails utilize an abandoned railroad corridor. There are many unique issues to consider when converting the rail corridor to a multiple use trail. The first step is to inspect the existing structure.

There are typically three components to the rail-trail: the subgrade (native soil mass), the subbase (manmade layer of stone and rock on top of the subgrade), and the trail surface (the material installed on top of the subbase).

The trail subbase should be evaluated for its condition and load bearing ability by a qualified inspector or structural engineer, coordinated through DCR's Design and Construction section (DAC). The subbase is usually a graded aggregate stone which provides bearing strength and improves drainage. If new subbase needs to be installed, it should be 4 to 8 inches thick, and compacted with a mechanical roller that weighs at least as much as the trail's anticipated design load, and made smooth and level.

Ballast is a railroad term applied to the layer of crushed rock used to elevate the railroad bed above the surrounding natural grade to provide for proper drainage, create a level surface for the ties and rails, provide structural stability for the track and reduce the maintenance demand of the roadbed. The ballast should be evaluated for condition and type present. If ballast is absent, an evaluation of the foundation soils should be undertaken, and the subgrade and subbase designed to support the trail. DAC should be consulted and coordinate the appropriate analysis and evaluation.

A structural engineer (coordinated through DAC) should evaluate the existing bridges, tunnels and other structures and improvements or modifications should be designed and completed. The structures should also be evaluated from a historical perspective, and if of any significance, that information included in the trail interpretive material.

Reference the New River Trail State Park Development and Management Plan for additional information on decking and rails.

Decking is necessary to apply to the existing railroad bridge to make it usable for a trail. The tread should be at least 7 feet wide with 8 feet clearance between rails on either side to serve two-way single file visitor traffic and service vehicles. To accommodate bikes and horses, 4-inch thick treated planks should be used. If only accommodating pedestrians, 2-inch thick planks will suffice. The planks should be parallel to the support beams, or at a 45 degree angle to the super structure. Gaps of 1/8 to 1/4 inch should be left for drainage, but any larger spacing is a potential hazard to bikes and horses.

Side railings shall be added to bridges for safety. Vertical posts are typically attached to the bridge deck or superstructure. Horizontal rails are then attached to the vertical posts. Construction design shall be completed by an engineer (coordinated through DAC), following American Association of State Highway Transportation Officials (AASHTO) guidelines. The vertical posts shall be no more than 5 feet apart. Typically three rails are used, with the underside of the bottom rail no more than 15 inches from the deck surface, the middle rail no more than 30 inches from the deck surface, and the top rail no more than 15 inches above the middle rail. Spacing between rails shall not be more than 15 inches. The rails shall be at least 42 inches above the surface for pedestrians, and 54 inches above the deck surface for bicycle and equestrian use. Vinyl-clad chainlink fence should be attached to rails to prevent children from climbing through. Guardrail and handrail construction should meet or exceed the requirements of the current edition of the Virginia Uniform Statewide Building Code. Equestrians should be instructed to walk across the bridge.

A top dressing is typically applied to the rail-trail surface that becomes the "impact surface". Any type of "finer" tailing and screening that is reasonably available can work well. New River Trail State Park utilizes Number 10 VDOT limestone screening for the top dressing. It is applied 2 to 1 inch thick over the entire trail, and in bad spots as much as 2 inches deep. This dressing provides a smooth surface that fills in spaces between coarser aggregates and leaves the top a suitable surface for bicycles, pedestrians and even horses. It requires grading and recoating every 2 to 3 years.

References

Strategic Land Planning, Inc. (1991). Development & Management Plan—New River Trail State Park. Alexandria, VA: Strategic Land Planning, Inc.

Ryan, Karen-Lee, Charles A. Flink, Peter Lagerwey, Diana Balmori & Robert M. Searns (Eds.). Rails to Trails Conservancy. (1993). Trails for the 21st Century, Planning, Design, and Management Manual for Multi-Use Trails. Washington, D.C.: Island Press.

Accessible Trails

Since the passage of the American With Disabilities Act (ADA) in 1990 there has been increased interest in designing new or modifying existing trails to make them accessible to persons with disabilities. Currently no official standards exist for creating accessible trails, however guidelines from the American With Disabilities Act Accessibility Guidelines (ADAAG), the Uniform Federal Accessibility Standards (UFAS), and the American National Standard Institutes (ANSI) provide good starting points. Efforts are underway to develop national standards for universal access in outdoor recreation, including trails. While it is neither practical nor desirable to conform all park trails to accessibility standards, every effort should be made to ensure that persons with disabilities have the opportunity to enjoy Virginia's natural, cultural, and historical resources.

Other terms describing the effort to make trails and other recreation structures accessible, include "barrier-free design," or Auniversally accessible. There is a range of disabilities that must be considered, and there are two major categories of people with disabilities: those who have a disability but are ambulatory, and those who must use wheelchairs. Because of the dimensions and unique physical limitations, the wheelchair is viewed as the common denominator for barrier-free designs, and as such, an assumption is made that an area accessible to a wheelchair will also be accessible for people with other disabilities. This has created some problems for individuals with some other disabilities such as visual limitations. Thus, the universal design approach came about, and is still under development.

Design and construction standards set forth for accessible trails as follows are an attempt to provide accessibility for individuals who use wheelchairs and hopefully be inclusive of many other disabilities. As new standards for design unfold, our approach may change.

Some of the guidelines and literature available for accessible trail design have different levels of standards based on the type of trail (shorter/developed vs. longer/ less developed) and level of accessibility (easy, moderate, difficult). We have adopted the more conservative standards to encompass the "easy" to "moderate" level of accessibility on a shorter trail. It is important to keep in mind that while providing access is important, and even imperative, in and around the developed area of the park and main recreational elements, modifying a trail solely for accessibility purposes at the expense of the recreational experience and state of the natural environment is inappropriate. There are varying levels of accessibility.

Refer to the Basic Construction Standards and Specific Trail Types presended earlier in this section to compliment the special standards for accessible trails, and refer to the publications specific to accessible standards for more detailed information.

Trail Layout-Trails should be designed to blend with the site's topography and natural setting as much as possible. Design guidelines for different trails within the same site will vary based on the type of access being provided, which is determined in part by the type of recreational activity offered, and the expected level of accessibility. There will be varying degrees of accessibility to a site's trail system.

In planning an accessible trail, choose a site that will not require steps, and that can provide for adequate resting, passing and turning spaces at recommended intervals.

Trail Width-Access routes and trails must be a minimum of 36 inches wide with passing surfaces of 60 inches by 60 inches. Passing surfaces shall be placed at the maximum interval of every 300 feet. The clear width may reduce to 32 inches for a maximum distance of 2 feet.

Vertical Clearance-The clear head space over the accessible route should provide 80 inches. Clear head room offers protection for persons with visual impairments.

Figure 4-43: Accessible Trail Clearing Standards

Trail Surface-The accessible route surface should be stable and firm. Changing surface levels should not exceed 2 inch. An example is where a boardwalk or bridge meets another trail surface.
Where wood decking is used, planks must run perpendicular to the direction of travel and joints must be no more than 2 inch.

Trail Grade-The grade of a trail should not exceed 10 percent (1:10 slope) with an overall maximum running slope of 5 percent (1:20 slope)

Level of Difficulty- It should be noted that the above mentioned requirements represent the <u>minimum</u> standards for an accessible trail. When planning a barrier-free trail one should consider whether the trail will serve all disabled persons who wish to use it. The following table provides design standards for two levels of accessible trails.

Special Considerations-

<u>Parking</u>

1) Accessible parking spaces shall be the spaces located closest to the accessible trailhead.

2) An accessible parking space must be 96 inches wide with an aisle way 60 inches wide beside it. The access aisle way must be part of an accessible route to the trailhead.

3) The surface of the parking area must be level and made of a hard, non-skid surface.

4) Accessible parking spaces shall be designated as reserved for people with disabilities by a sign showing the international symbol of accessibility. Such signs shall not be obscured by a vehicle parked in the space.

	Easy	Moderate
Width	48 inches	36 inches
Passing Spaces	200-foot maximum interval	300-foot maximum interval
Maximum grade	8 percent (1:12 slope)	10 percent (1:10 slope)
Sustained running slope	5 percent (1:20) maximum	5 percent (1:20) maximum
Distance allowed at maximum grade	30 feet maximum	50 feet maximum
Cross slope	3 percent (1:33) maximum	3 percent (1:33) maximum
Clear head space	80 inches	80 inches
Rest areas/Landings	400-foot maximum interval	900-foot maximum interval
Edge Protection and Curbs	Provide 4-inch curb on downhill side of trail & at landings	Provide 4-inch curb at dangerous and difficult locations & at landings
Handrails	Provide 34"-38" railings at dangerous or difficult locations and at bridges...etc.	Provide 34"-38" railings at dangerous or difficult locations & at bridges...etc.
Level Changes	2 inch maximum	2 inch maximum
Surface	Hard, skid resistant surface	Very firm, compacted, skid-resistant surface

Table 4-1: Summary of Accessible Trail Design Standards

5) Directional signs shall indicate where accessible entrances, parking, restrooms, and other accessible facilities are located.

Required Special Structures

1) Rest areas or landings are required at the top and bottom of each maximum grade segment and where trails change direction (switchbacks) on maximum grade sections. Landings must be a minimum of 60 inches long, the width of the trail and level.

2) Edge protection at dangerous sections of trail and at landings shall have curbs, walls, or railings that prevent people from traveling off the trail. Curbs or barriers shall be a minimum of 4 inches high.

3) Handrails for ramps, bridges, boardwalks, etc. shall be mounted between 34 and 38 inches above the trail or structure surface and shall maintain a consistent height.

Signage

1) Trail signs should be located at the edge of the trail, and not protrude into accessible route of travel.

2) Trail signs should include accessibility information, however, the format is not presently standardized. Signage and universal signage is a topic under review among leaders in the accessibility field and standards may be adopted in the near future.

References:

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Hunter, Carol. (1994). Everyone's Nature - Designing Interpretation to Include All. Helena and Billings, MT.: Falcon Press Publishing Company, Inc.

North Carolina Cooperative Extension Service. (1995). Recreational Forest Trails: Plan for Success. Woodland Owner Note 29. Raleigh, NC: North Carolina State University.

Project Play and Learning in Adaptable Environments, Inc. (PLAE, Inc.). (1993). Universal Access to Outdoor Recreation: A Design Guide. Berkeley, CA: PLAE, Inc.

5. Operation and Maintenance

A greenway or trail, once established, becomes an institution in your community requiring management and maintenance. These needs will vary greatly from project to project, depending on the goals and functions of the greenway and the level of development and use of a trail. For example, while a conservation greenway with a "hands off" policy may require little management and maintenance, a recreational trail will require major maintenance tasks, such as periodic resurfacing

.

Recreation professionals should have identified the needs of your project and addressed them in the master plan. This section is intended to provide an overview of general management and some maintenance guidance from greenway and trail managers with practical field experience in various recreation facilities throughout Virginia.

Refuse Removal

Vegetation Control

Minor Repairs

Managing the Greenway or Trail

Administration is easiest if the greenway or trail is operated by an existing NGO or a local governmental department. Otherwise, appropriate administrative structures and policies must be created. Management activities can be grouped into the following categories:

MANAGEMENT ACTIVITIES

- Supervising staff and volunteers
- Raising operational funds
- Administering the operating budget
- Managing Use Conflicts
- Implementing policies
- Conducting public relations activities
- Planning future work

Maintaining the Greenway or Trail

In the maintenance plan section of the master plan you identified maintenance tasks, specified a timetable, and identified who will carry out each activity. Maintenance tasks generally fall into one of three categories listed and the described below:

Routine Maintenance Tasks - Routine maintenance tasks will be scheduled and performed by staff and volunteers at various intervals. The following are some routine maintenance tasks that will commonly be needed:

Long-Term Maintenance - The master plan should

ROUTINE MAINTENANCE TASKS

Activity:	Interval
Security patrol	Daily
Clean comfort stations	Daily
Refuse removal	Weekly
Vegetation control, grass	Weekly
Inspect for maintenance	Monthly or after storms
Clear culverts, drains	Every fall or after storms
Vegetation control, brush	Twice per season
Snow and debris removal	As needed
Minor repairs	As needed

Tunnel/Bridge Repair

indicate likely long-term maintenance needs. To prepare for these expenditures, your annual operating budget should include contributions to a long-term maintenance fund. Alternatively, a fundraising campaign may be needed in advance of any major maintenance work. Be aware that some long-term maintenance activities may require construction permits and must be conducted in compliance with local ordinances and codes.

Trail Surface

Long-term maintenance may involve upkeep such as

LONG-TERM MAINTENANCE TASKS

Activity:	Interval
Repaint blazes	Every 5 years
Repaint buildings	Every 5 years
Renovate buildings	Ever 10-20 years, or as needed
Resurface trail	Every 10 years, or as needed
Inspect bridges and tunnels	Yearly

Emergency Repairs - Emergency repairs may be necessitated by storm damage, flooding, or other accidents. A wise management plan will include contingency plans to quickly deal with these calamities and effect repairs. Contingency plans for storm damage, for instance, might include preparing a list of volunteers who own chain saws, winches, trucks, and other equipment necessary for clearing downed trees from a trail. Contingency plans to protect a greenway from a chemical spill could include mobilizing fire departments, VDOT, and DEQ spill response teams.

repainting buildings or replacement of items with a limited life expectancy. For example, picnic tables should be replaced every five or ten years. Buildings, in particular, require considerable care and occasional renovation. Competent maintenance staff or volunteers on a properties committee can advise on proper care and maintenance. Numerous manuals for the homeowner and contractor are available through bookstores and libraries.

The following are some items on greenways and trails that should be scheduled for long-term maintenance:

Budgeting for Operating and Maintenance Costs

The operators of a greenway or trail will need to raise funds for an annual operating and maintenance budget. In the case of public ownership, the administering agency will dedicate some of its annual appropriations to maintenance. If multiple municipalities are involved, each might be assessed some portion of the maintenance costs based on a predetermined formula. Occasionally, matching funds are provided to individual municipalities that earmark a percentage of their annual budget for trail operation and maintenance. As with development costs, annual operating and maintenance costs vary greatly depending on the level of development and usage.

The balance of this section is taken from the *Trail Development and Management Standard Operating Procedures Manual* developed by DCR, Division of State Parks.

Maintenance of Trails

Trail maintenance begins immediately following construction and is an ongoing regular aspect of park operations. An objective in trail construction is to minimize the need for maintenance. However, in order to insure visitor safety and resource protection, a system of regular inspection followed by routine and necessary maintenance is imperative. Maintenance is the key to keeping your investment in the trail. Routine trail maintenance often suffers during times of budget reduction, yet the trails typically remain open. This is an unwise practice, often resulting in substandard and poorly marked trails, and as time passes, the cost of restoring the trail to acceptable standards has substantially increased.

The condition and resulting maintenance demands of a trail is affected by the amount and type of use the trail receives. Each trail has a usage limit. The usage limit however, is determined by more than just the amount of use. The usage limit is influenced by the following factors: environmental conditions impacting the trail, quality of site selection, ground cover and terrain, trail construction, adherence to maintenance requirements, and the volume and types of trail use.

Changes to any of the influencing factors may require modifications in the usage limit through the assessment and inspection process. Modifications could include re-routing the trail, restrictions on type of use (bikes, horses), improvements to tread surface or water drainage structures, and potentially even closing the trail.

In today's litigious society, trail users may be tempted to sue the managing agency for any accident that occurs

on a trail. Fortunately in the Commonwealth, the Virginia Tort Claims Act (8.01-195.1, Code of Virginia) (Appendix XV) defines the scope of governmental liability. Furthermore, the Recreational Use Statute (29.1-509, Code of Virginia) (Appendix H) more clearly defines the liability of government agencies when providing recreational opportunities for the public. These laws shift the burden of responsibility from the land manager to the trail user. This by no means completely relieves the agency from all liability. Government agencies are liable when found to be negligent. Negligence is predicated on the knowledge of a dangerous condition. For example, if a land manager knew about a hazard and failed to make repairs or post warnings, before an accident occurred, the agency could be found liable.

The best solution to liability problems is to perform periodic inspections and maintenance to trails and support facilities. Documenting these regular inspections can prove adherence to legal duties and significantly reduce the chance of incurring liability claims.

To ensure that trail standards are met and visitors and resources are protected, a systematic approach of regular inspection and maintenance shall be undertaken on all open trails. Trails that fail to meet standards will be closed until such time that they can be brought up to standards.

Standards

The standards are described in 6 categories—Trail Log and Inspections, Vegetation Maintenance, Tread Maintenance, Drainage Maintenance, Structure Maintenance and Sign Maintenance.

Trail Log and Inspection- A trail log is prepared for each trail. Inspection of each trail is conducted at least twice a year, utilizing the Trail Log and Inspection Form. Log and inspections are dated when conducted and kept on file.

Conditions identified through the inspection that fail to meet standards are corrected in a timely manner, or the trail is closed.

Vegetation Maintenance- Vegetation shall be cleared such that the Trail Corridor has the required vertical and horizontal clearance dictated by the type of trail.

Trimming and pruning activity should be done in a responsible manner, minimizing impacts/hazards to users and the resource. See Work Instructions for Vegetation Maintenance under Routine Maintenance Activities section of this chapter.

Areas devoid of vegetation and subject to erosion, particularly slopes, shall be seeded and revegetated with appropriate native plants or other erosion control measures implemented.

Trees identified as posing a hazard to trail users shall be removed by certified tree fellers.

Appropriate vistas are maintained by periodically removing or thinning vegetation.

Tread Maintenance-The trail foundation and the trail tread shall be in good condition and free of hazards.

The tread shall be maintained in the original design condition and/or outsloped with intact surface. See

Type of Trail	Vertical Clearance	Trail Width	Horizontal clearance beyond trail width
Hiking	8 feet	2 feet single lane 5 feet double lane	2 feet
Biking	8 feet	4 feet single lane 8 feet double lane	2 feet
Mountain Biking	8 feet	2 feet single lane 5 feet double lane	2 feet
Equestrian	10 feet	4 feet single lane 8 feet double lane	2 feet
Multiple Use	10 feet 8 feet if no equestrian	8 feet, 10 feet if heavy use	2 feet

Table 5-1: Summary of Trail Corridor Clearing Standards

Work Instructions for Tread Maintenance under Routine Maintenance Activities section of this chapter.

Surface material shall be replaced and/or added, when its absence causes erosion, ruts, or other undesirable conditions.

Rail-trails shall be graded at a minimum, every 2 to 3 years, and the finish surface, or impact surface, reapplied.

Drainage Maintenance-Surface water control measures must be sufficient and adequately functioning to prevent erosion, sedimentation, and loss of the trail tread, and serve to preserve the integrity of the trail construction. This includes regular cleaning and repair of culverts, drains, ditches and waterbars, and the installation of new devices to eliminate standing water or erosion problems when reshaping the tread does not solve the problem.

Structures are constructed as described in the Basic Construction Standards section of this manual. See Work Instructions for Drainage Maintenance under Routine Maintenance Activities section of this chapter.

Structure Maintenance- All structures are functional and intact, and must not subject the user to any hazard. This includes Wet Area Crossing Structures, Water Crossing Structures, Special Structures and Support Structures**.** Routine inspections indicate where repair and replacement is needed—check for structural integrity, user safety and resource protection.

Structures must be constructed as described in the Basic Construction Standards section of this manual. See Work Instructions for Structure Maintenance under Routine Maintenance Activities section of this chapter.
Sign Maintenance-All trailheads, intersections and junctions are clearly marked, and signs are maintained in good condition.

Evaluation and Inspection
Systematic, documented and regular inspection of all trails provides the mechanism to insure that visitor safety and protection of the resources is achieved. However, unless inspections are followed by actual maintenance it is only an exercise in documenting unacceptable conditions. If actual maintenance can not follow the identification of unsafe or unacceptable conditions the trail should be temporarily closed until corrections can be made.

Methods-Trails shall be inspected at a minimum of twice a year. Suggested times would be after the winter to assess any winter damage, and then in late summer to assess use impacts. Ideally, all trails of moderate to heavy use would be inspected quarterly. At parks with well developed volunteer programs that include trail maintenance volunteers, monthly inspections may be possible and are recommended.

The Virginia State Parks Standard Trail Log and Inspection System uses the Trail Log and Inspection Form found in Appendix XIV. As the name implies, the form is both a log and an inspection. Initially, the log information is completed describing and inventorying the physical features of the trail. The log is completed one time in the life of the trail, unless changes to the trail occur, requiring an updating of the log. The log provides important details to efficiently maintain the trail. Trail features should be located and described using a measuring wheel, measuring distances from the beginning of the trail. The inventoried information is entered on the form and serves as a reference to complete the inspection.

When inspections are conducted, the form has the log information preprinted on it. Inspection results are recorded in the spaces provided. A new form may be completed each time an inspection is done, or a spreadsheet could be set up and used showing the conditions of previous inspections at each subsequent inspection.

When inspections are conducted, any routine work should be completed at the time of inspection, such as removing down wood, trimming overhanging branches, picking up trash and performing minor repairs to structures. This not only precludes the need to list this work as "needed", but efficiently utilizes the time of the person conducting the inspection, and saves time of a second trip.

The completed Trail Log and Inspection Forms shall then be kept on file to serve as documentation of the inspections, reference for maintenance work when performed, and as a handy reference of a description of the trail when inquiries are made. Park management is responsible for insuring that the Inspection files are kept up to date.

Forms-The Trail Log and Inspection Form appears in Appendix XIV.

Usage Limits-The following table illustrates the usage levels that can be designated for each trail. This should assist in trail maintenance and management decisions.

If it is not feasible to adequately repair the trail to within its usage level, then other alternatives shall be considered, such as temporary or permanent closing, constructing a new trail to disperse the volume of traffic, resurfacing the trail, or changing the types of use(s) allowed on the trail.

Routine and Preventative Maintenance

Equipment and Personnel Considerations-Nothing can be more critical to the success or failure of a maintenance program than properly preparing for the job. Common tools needed for trail maintenance include lopping shears, chain saws, brush-axes, rakes and/or leaf blowers. In addition, fuel, oil, and safety equipment must be carried along. If available, a small all terrain vehicle (gator, workmaster) can make routine cleanups a one-man operation.

Additionally, specialized equipment will likely be required during some trail maintenance. This includes tractors, post augers, stump grinders or backhoes. Always follow manufacturer's operating and safety instructions when using this type of equipment, and be sure that all personnel are trained before they attempt to operate.

Please refer to the chapter on trail construction and maintenance equipment for a more detailed description of trail tools.

Routine Maintenance Activities-Trail maintenance shall be part of a park's routine maintenance program. Routine trail maintenance includes basic tasks required to keep the trail in an acceptable operating condition. Tasks to be performed include trimming intrusive growth, removing limbs or logs from the trail, cleaning debris and built-up sediment from culverts, ditches and other water control structures, cleaning debris and/or trimming growth from around boardwalks, steps and other such structures, trash pickup, and cleaning/ trimming around signs. Felling of leaning or hazardous trees may be required, but shall be performed only by certified individuals.

Routine trail work may be performed by an individual or a small crew of workers, and parks are often successful in finding volunteers eager to conduct regular trail maintenance. Inmate or other alternative labor sources can be successfully utilized. Routine maintenance shall occur at least following (and/or in

Below	Usage limit is not being met. Although custodial care is needed, maintenance needs are low. Considerations could be made to increase volume of traffic and/or trail use.
Normal	Trail is being sufficiently utilized. Trail maintenance is moderate. Changes should not be made to increase or decrease volume of traffic or trail use.
Above	Trail is being over utilized. Trail maintenance is excessive. Damage is being caused to the trail and to resources within its corridor. Considerations should be made for remediation and to reduce volume of traffic and number of uses (types of uses—hiking, biking, etc.).

Table 8-2: Trail Usage Limits

conjunction with) the semiannual inspections, and after major storms. Strive for conducting monthly trail maintenance tours.

The routine trail maintenance work instructions are activities one would do to achieve the maintenance standards described earlier in this chapter. The work instructions are organized in categories to parallel the trail standards.

1. Vegetation Maintenance

1) Side branches extending into the trail corridor should be cut flush with the parent branch or stem, leaving no stubs and allowing for natural healing to take place (do not use an axe).

2) Trees and brush outside the tread should be cut as close to the ground as possible, leaving no sharp-pointed stumps or stems. Stumps should be treated with herbicides to prevent regrowth and sprouting (approved herbicides only). Holes left from stumps must be filled and tightly packed.

3) Small trees and shrubs within the tread should be grubbed out to prevent tripping, and holes should be filled and compacted.

4) If more than half of a tree needs to be pruned, remove the tree.

5) Any fallen tree lying on or over a trail should be removed, or if a large tree, the portion lying across the trail. Cuts should be made to allow the cut section to be rolled free with minimum effort. If possible, the entire windfall or the portion below the uphill cut should be rolled below the trail.

6) Debris from clearing and pruning should be disposed of by chipping or removed from the trail corridor. Debris may be used for control of traffic or erosion. Slash should be scattered on the downhill side of a trail.

2. Tread Maintenance

1) Restore the tread to its original design condition, free of rolling stones, rock points, stumps and shrub roots; it should be smooth and firm; fill any holes creating by rock or stump removal.

2) Tread should be outsloped so that it is lower on the downhill side.

3) Remove accumulated slough from the inside slope and reshape the tread to restore outslope.

4) Remove accumulated berm from the downhill side of the tread and restore outslope.

5) Check for and prevent trail creep by placement of border logs or rocks (but do not interfere with desired drainage).

6) Replace surfacing that has been removed; add surfacing when the natural surface has been damaged or destroyed or when the existing material is unstable.

3. Drainage Maintenance

1) Clean out and repair culverts and drains.

2) Clear, repair and reseat water bars.

3) Add surface water control structures where needed to eliminate standing water or erosion problems, when reshaping the tread alone won't solve.

4. Structure Maintenance

1) Routine inspections should indicate where repair and replacement is needed; check for structural integrity, user safety, and resource protection.

2) Major repairs become a separate project from routine trail maintenance.

5. Sign Maintenance

1) Signs should be cleaned and the supporting frame trimmed around, so that the sign is very visible and readable.

2) Damage to sign or frame should be repaired or replaced.

3) Blazes should be easily visible, and/or repaired or added as needed.

Preventative Maintenance Projects-If, during the course of an inspection or routine maintenance tour of the park's trails, a problem is identified that requires more than routine effort to correct, then these items should be brought to the attention of the person directly overseeing the maintenance crew. Depending on the condition and significance of the item(s) in question, the trail may require temporary closure. For example, a rotten and deteriorating bridge that renders a trail unsafe would require the trail to be closed until repairs have been done.

Projects requiring significant planning, design, and implementation time shall be submitted to the appropriate staff member (Park Manager, Assistant Manager, Chief Ranger) for incorporation into the current operations plan and project schedule. Depending on the scope of the project, it may need to be incorporated into the following year's budget as a preventative maintenance or resource management project. The annual budget/ operations plan shall include trail maintenance activities as both routine operations and preventative maintenance and/or resource management funding projects. A few examples of each type of project are listed below.

Preventative Maintenance Projects could include:

1) Painting/staining/sealing bridges, benches and walks

2) Replacement of rotten or deteriorating structures

3) Sign replacement and upgrade

4) Addition of culverts, waterbars, or other structures

5) Replenishment or addition of gravel or other surfacing material

Resource Management Projects could include:

1) Construction of bridges or elevated walkways over sensitive or eroded areas

2) Herbicide application to eliminate or reduce unwanted plant species (Kudzu)

3) Construction of retaining walls, cribbing , tiles, and other structures to manage drainage problems

4) Re-routing of trails to avoid unstable or sensitive areas

Trail Closing

When closing a trail, whether temporarily or permanently, the trail should be given the opportunity for its natural features to rehabilitate or for areas that have undergone maintenance or construction to properly stabilize. A common reason for closure is to allow for unsafe conditions to be corrected or eliminated. Simple

restoration may consist of blocking new shortcuts and allowing the vegetation to recover. Complex restoration projects include obliterating the trail, re-contouring, and planting native species. Careful monitoring and follow-up are necessary to ensure that the goal is achieved.

Naturalizing strategies include: closure, stabilization, re-contouring, re-vegetation, and monitoring. Each abandoned trail shall be closed. This is true whether an entire trail or portion of a trail is permanently or temporarily abandoned. If the trail is not blocked to prevent use, then the goal of the closure, whether temporary or permanent, may not be achieved. Closure is particularly important if stabilization and re-vegetation are being attempted. The abandoned tread shall be blocked to all traffic, re-contoured, and disguised to prevent users from being tempted to take it. This work shall be conducted for all segments of an abandoned trail that is visible from trails that remain open.

Techniques for Closing a Trail- If the closed trail has eroded into a trench, fill the visible ends to bring the level back up to the original ground level and install check dams and erosion control blankets as necessary to protect the fill. Checkdams can be logs from dead trees on site, low stone walls, or charred logs (surface charring preserves the wood without chemical treatment).

In other areas of severe erosion which are not visible from other established trails or access points, build checkdams in the bottom of the trench to prevent it from becoming any deeper.

In less-eroded areas, scarify (break up and loosen) compacted soil and reseed it with a native grass mix matching onsite grasses and vegetation.

If possible, blend the visible ends of the closed trail into the surrounding undisturbed area by extending adjacent rocky areas, vegetation patterns, fallen trees and branches, and other natural objects into the closed end.

Emulate natural patterns — plant dead stumps with their roots buried, drop dead branches under trees as if they fell off the tree, and cover the bare ground with a natural layer of organic debris (needles under conifers, leaves under deciduous trees, dry grass in grassy areas). Often, these techniques can visually erase a trail without vegetative plantings.

When the Trail Fails to Meet Standards-In cases where the trail standards cannot be met, closure should be considered as an alternative to attempting to repair the trail. Closure is then an attempt to naturalize the trail and its surrounding resources and either bring the trail back to standards or to eliminate the trail altogether. The Trail Log and Inspection Form should reflect substandard conditions that led to the closing.

Temporary closure may allow for areas that have undergone maintenance to be left undisturbed for a period of time to allow for adequate stabilization. Also, temporary closure will allow for the area to rehabilitate to a condition that will bring the trail back up to standards. If a portion of trail needs to be temporarily closed, re-routing may be necessary for that period of time unless the whole trail is to be closed. It is important for the temporary closure to last long enough for proper stabilization and re-vegetation.

Permanent closure will allow for the trail to be influenced to convert back to its original habitat and appear as if the trail never had existed. This alternative should be chosen if the trail's condition is beyond repair,

if usage is too low, or if impacts of the trail despite routine maintenance are unacceptable.

Seasonal Closing-Seasonal closure would allow for the trail to be closed during times of the year that may impact the quality of the trail, or to wildlife resources. Examples of reasons for seasonal closure are reducing impacts during wetter times of the year or when there may not be enough staff during the off-season to maintain the trail, or to eliminate human interference with bald eagle nesting efforts.

Trail Evacuation-There are occasions when the park=s trails need to be temporarily closed, such as during various severe storms, emergencies or other incidents. Often, the entire park is evacuated or closed. Each park shall have a plan for efficiently closing and evacuating the trails within the park during these situations.

Refer to Lake Anna Nuclear Power Plant Evacuation Plan, First Landing/Seashore's Hurricane Evacuation Plan, and any others that may exist on file in Resource Management & Visitor Protections Section office.

References

US Department of Agriculture— Forest Service, Technology and Development Program. Publication 4E42A25 -Trail Notebook. (1996). Trail Construction and Maintenance Notebook. Missoula, MT:USDA-FS Missoula Technology & Development Center.

US Department of the Interior— National Park Service, Denver Service Center. NPS-2023. (1992). NPS Trails Management Handbook. Washington, D.C.: U.S. Government Printing Office.

Parker, Troy Scott. Open Space and Trails Program, Pitkin County, Colorado. (1993). Trails Design and Management Handbook. Pitkin County, Colorado.

Appendices

Appendix I:
Additional Information
and Sample Sources

Appendix I: Additional information and Sample Source

For Information or Samples	Contact
Brochures	Greenway and trail organizations
Business plans	Small business development centers
By-laws	Greenway and trail organizations
Conservation easements	Local land trusts or conservancies, VOF
Design specifications	AASHTO
Environmental assessment forms	DEQ
Feasibility studies	DCR
Intergovernmental cooperation agreements and resolutions	PDCs, DCR
List of existing rail-trails	VDOT, Rail Transportation Division
List of railroads	Rails-to-Trails Conservancy
Long term lease agreements	Local land trusts or conservancies
Scenic resource inventory tools	Scenic America, USFS
Suppliers of recycled building materials	DEQ, Waste Division

Appendix II:
Sample Partner Profile

Appendix II: Sample Partner Profile

This sample survey was developed by Jenkins & Quinn for the Cambria County Conservation and Recreation Authority.

- Distribute to key contacts
- Take to interviews with key informants
- Provide copies at initial public meetings

Partner Profile

1. Name_____
   Address:_____
   Telephone:_____
2. Are you a municipal official? _____Yes _____No
   If yes, title:_____
3. Do you feel that people using a trail through your community would have a positive or negative effect on both your property and the area in general?
   ___Positive ___ Negative
1. Do you think business opportunities related to the trail would develop? ____Yes ____ No
2. What do you see as your municipality's role in assisting trial development? (Check as many as you think may apply.
3. _____ preventative maintenance
4. _____capital improvements
5. _____refuse removal
6. _____use of community recreation funds
7. _____police protection
8. _____other_____
9. Do you think your community is interested in attracting visitors, such as trail users, to your area? ____Yes ____No
10. Is there an active organization or person in your community who is recreation or trail oriented?
11. Is there a person in your community who is familiar with the general history of your area, including the history of the railroad or the canal in the vicinity of the trail?
12. Please use the space below for writing any additional comments. Thank you!

Source: Pennsylvania Greenways Partnership

Appendix III: Sample Permission Form and Liability Waiver

Appendix III: Sample Permission Form and Liability Waiver

This is a sample for informational purposes only. Check with your own legal counsel for an instrument appropriate to your needs. Landowners such as utility companies may have a standard form for their own use. Each individual should sign a separate release form. Parent or guardian must sign for persons under age 18. Provide the landowner with your address and phone number. Provide description of any vehicles which will be used on the property.

Release and Permission Form

I (Name),_____, intending to be legally bound, do hereby waive for myself and anyone claiming through me, my right to sue (Landowner)_____, their heirs, successors, administrators and assigns, for personal injury and/or property damage incurred while on the property of (Landowner)_____.

This release is also intended to preclude the parties and their heirs, executors, administrators, successors and assigns from joining (Landowner)_____ as an additional defendant in any action.

This waiver is given in consideration for permission for the party named herein to enter upon the lands of (Landowner) _____ during the time period from (Date)_____ to (Date) _____.

Signed, this _____ day of _____, 1999.

(Signature)_____

(Witness)_____

(Signature of parent or guardian if person is under 18 years of age)

Source: Pennsylvania Greenways Partnership

Appendix IV: Sample Trail User Survey

Appendix IV: Sample Trail User Survey

Based on a form developed by the York County Rail Trail Authority. Provide a distribution box, collection box and firm writing surface. Locate in area sheltered from the weather. Collect and re-supply weekly. Compile results monthly or seasonally.

Trail User Survey

Please take a few minutes to give us some helpful information. Thank you for your cooperation.

Today's date: _____

I was on the trail from _____ am/pm to _____ am/pm

I/We used the trail to:

_____run _____bike _____hike/walk _____ride horseback

_____other (Please describe: _____)

I/We use the trail:

_____for the first time today _____daily _____weekly

_____monthly _____seasonally _____during special events.

How long did it take you to get to the trail today? _____

How many miles did you travel to get to the trail? _____

Did you stop for purchases along the way such as rooms, meals, supplies?

Merchant Location _____

Item or service purchased _____

Amount spent _____

Where did you start on the trail? _____

Where did you end or how far did you go before returning to start? _____

Number in your party: _____

Please indicate the number of trail users by age group that were in your party today: _____

Trail User Survey (continued)

Male: ___0-5 ___6-12 ___13-18 ___19-29
___30-39 ___40-49 ___50-59 ___60+

Female: ___0-5 ___6-12 ___13-18 ___19-29
___30-39 ___40-49 ___50-59 ___60+

Trail conditions were:

___ Excellent ___Good ___Fair ___Poor

Describe what you liked most and least about your trail experience: _____

Would you be interested in helping on projects or activities related to the trail? If so, Please provide your name, address, phone number, and particular interest, if any:

_____

Name: _____

Telephone: _____

Address: _____

Municipality: _____ State: ____ Zip: _____

Interests: _____

Source: Pennsylvania Greenways Partnership

Appendix V·
A Community Value Survey

A Community Values Survey

Which of the following open space, transportation, recreation, and/or environmental resource issues do you believe are most important? (Please indicate a maximum of three issues, ranking them from 1 to 3, with 1 being the most important.)

A. Agriculture preservation
B. Open space conservation
C. Protection of historic buildings and sites
D. Natural Resources protection (e.g., groundwater, floodplains, wildlife habitat, important woodlands)
E. Opportunities for passive recreation (e.g., trails, scenic views)
F. Availability of active recreation facilities (e.g., areas for field and court sports, etc.)
G. Alternative modes of transportation (such as walking trails and safe bicycle facilities throughout the community) which reduce reliance on motor vehicles
H. Other: _____

2. The township plans to use several means to achieve its open space and recreation goals including donation, purchase, and regulation. In some cases, spending township funds may be the most effective approach. Assuming the funds were clearly marked for the stated purpose, would you be willing to have your current municipal taxes matched with grant funds to support the following? *(Please indicate your choices with a X.)*

A. Acquire open space
B. Acquire trail easements or rights-of-way
C. Purchase land for park and recreation facilities
D. Construct trails throughout the community to provide alternative forms of transportation and recreation
E. Develop park facilities on existing township lands
F. Operate active recreation programs (e.g., youth leagues)
G. Operate community programs (e.g., community fairs, parades, cultural events)
H. Other: _____

2A. Would you be willing to pay increased municipal taxes to support the items you indicated a willingness to support above?

Yes No

3. How well, in your opinion, is the township addressing the following issues? (Indicate one of the following responses for each category: Satisfied, Insufficient Twp. action/regulation, Twp is overly involved, No Opinion/Inadequate Information.)

A. Environmental resource protection
B. Historic resource protection
C. Conservation of open space
D. Provision of, and access to, recreation facilities and programs
E. Protection of existing trail network

Source: Brandywine Conservancy

F. Provision of trails for recreation purposes or as alternative forms of transportation

4. Where do you generally participate in recreational activities? *(Please check as many as apply.)*

At home	At school
At work place	Along the existing trails in the township.

On trails provided by _____

At local parks; please specify here

_____

At private recreational sites (e.g., the YMCA, spas, athletic clubs); please specify which sites.

_____

Other:

_____

5. For each of the following recreational activities, please indicate those in which you and members of your household currently participate: Please also note those activities for which you would support actions to make more facilities available. (Place a check next to each activity that applies.)
   - A. Sight-seeing or pleasure driving
   - B. Walking/Hiking
   - C. Jogging
   - D. Nature enjoyment/contemplation
   - E. Fishing
   - F. Swimming
   - G. Boating
   - H. Canoeing
   - I. Field sports (e.g., softball, baseball, football, soccer)
   - J. Tennis
   - K. Basketball
   - L. Volleyball
   - M. Bicycling
   - N. Winter sports (e.g., ice skating, cross-country skiing)
   - O. Camping
   - P. Picnicking
   - Q. Golf
   - R. Horseback riding
   - S. Other equestrian activities
   - T. Community recreational programs
   - U. Other: _____

6. What is the principal use of your property? *(Check only one.)*

Residence only _____ Farm _____

Office Commercial

Investment (including residence(s) rented to another)
Industrial/Manufacturing

Other: _____

7. Approximately how large is your property? *(Check only one)*
   - Less than 1 acre
   - 1—2 acres
   - 3—5 acres
   - 6—10 acres
   - 11—50 acres
   - More than 50 acres

8. Please indicate the type of dwelling in which you live.
   - Single-family detached house
   - Twin, duplex, or double
   - Multiunit building (e.g., apartment, townhouse, condominium)
   - Mobile home
   - Nonresident property owner
   - Other: _____

9. How long have you lived in the township?
   - Less than 1 year
   - 1—5 years
   - 5—10 years
   - 10—25 years
   - More than 25 years
   - Nonresident property owner

10. Would a local network of trails, linked to recreation areas and/or schools, work, or commercial areas make it easier for you and/or your family to travel to local destinations or participate in recreation activities?

Yes No

If yes, please indicate the types of trail(s) you would prefer:
- Walking/hiking
- Horseback
- Bicycle (pedal)
- Other _____

11. Please tally the number of persons in your household in each of the age groups below. Enter the number of persons in your household in that person's age group. Also, would you circle the mark for the person or persons who is (are) completing this form?

Males	Females	Age Groups
_____	_____	0—5 years
		6—11 years
		12—18 years
		19—45 years
		45—65 years
		Over 65 years

12. If trails are created in _____Township, what means would you prefer be used? Check all that you feel are appropriate.
    _____Create trails beside existing roads
    _____Create trails on former rail corridors
    _____Create trails on private property with owner's permission
    _____Require trails to be created as part of the subdivision process
    _____Other means?

13. For those members of your household currently working, where is/are their place(s) of employment? (Please indicate one place of employment for each adult working.)
    Work at home/farm
    Work inside the township
    Work outside the township. If outside the township, please give location:
    _____

Appendix VI:
Trail Use Rules and Regulations Guidelines

Appendix VI:
Trail Use Rules and Regulations Guidelines

Trail use rules and regulations clarify what is expected of users and will vary greatly depending on the nature of terrain, facilities, and user groups. Consider the following in all cases:

- Give reasons for the rules
- Provide a brief statement of the type of trail experience sought
- Print rules in brochures and on maps
- Post regulations prominently at trail heads

Rules and regulations should address the following:

- Trail uses permitted or prohibited
- Hours of operation (usually from dusk to dawn)
- Trash policy (usually Carry In, Carry Out)
- Fire policy (if, where, and when fires are permissible)
- Wildlife protection policy (usually do not collect or disturb wildlife)
- Use limitation (usually stay on the trail and stay out of marked sensitive areas)
- Speed limit (for bicycles and motorized vehicles)
- Lane usage (for multi-use trail) or direction of travel (for one-way loops)
- Pet walking policy (usually dogs must be on leash at all times and curb your dog)

Source: Pennsylvania Greenways Partnership

Appendix VII:
Trail Assessment Form

Appendix VII: Trail Assessment Form

- Train volunteers to use this form by assessing a section together
- Divide the trail into tenth mile segments and mark with stakes
- Document with photos before and after improvements

Trail Assessment Form

Date: _____
Segment: _____
Gradient: _____
Trail Surface Material: _____
Width: _____
Height of overhanging vegetation: _____

Condition of trail surface: _____
(rough, smooth, level, uneven, pitted, rutted)

Drainage: Draining onto or across trail bed
Draining off trail bed _____
Water standing on trail bed _____

Bridges and culverts: _____
(list size, condition, apparent effectiveness)

Utility Crossings: _____
(underground, above ground)

Road and railroad crossings: _____
(describe access, parking, sight lines, general appearance)

Adjacent land use: _____
(farm, forest, residence, industrial, commercial, other)

Potential environmental hazards: _____
(dumping, tanks)

Potential attractive nuisances: _____
(cliffs, cellar holes, wells, towers, abandoned buildings)

Potential positive attractions: _____
(vistas, overlooks, historic sites, cultural sites)

Source: Pennsylvania Greenways Partnership

Appendix VIII: Model Easement for a Trail

Mod l Easement for a Trail

THIS GRANT OF EASEMENT AND DECLARATION OF RESTRICTIVE COVENANTS, hereinafter referred to as the "Easement" made the day of in the year of our Lord One Thousand Nine Hundred and Ninety-_____ (199_).

BETWEEN,_____, (husband and wife) (single man) (single woman), having an address of _____, _____, party of the first part, hereinafter called "Grantor",_____

AND

TOWNSHIP OF _____, party of the second part, hereinafter called "Grantee,"

WITNESSETH;

WHEREAS, Grantor is the owner of certain tracts of ground located in Township, County, Commonwealth of Pennsylvania, containing acres of land, more or less, hereinafter called the "Trail Easement Area", which includes the following parcels; as shown on a plan entitled , dated_____, 199__, last revised_____, 199__, prepared for_____, by_____, and further revised on_____, attached hereto and made a part hereof as Exhibit "A", and as described by legal descriptions, attached hereto and made a part hereof as Exhibit "B"; and

WHEREAS, the trail easement area contains _____ feet/miles of public trail(s) which, by this Easement, will be available for outdoor recreation and transportation by and the education of the general public; and

WHEREAS, the Trail Easement Area contains greater than _____ miles of frontage along _____ Road, and _____ Road, and the public travelling these roads are afforded scenic views of the forestlands, grasslands, farm fields, and wetlands, whose beauty and open character shall be available for outdoor recreation and transportation by and the education of the general public by this Easement; and

WHEREAS, the_____Township Comprehensive Plan, adopted in 19__, sets forth general community goals, which include ... [Indicate here any goal which would directly or indirectly relate to the development of the trails system]; and

WHEREAS, the_____Township Zoning Ordinance, adopted in 19__, defines community objectives which include "Securing and protecting pedestrian and non-motorized transportation facilities consistent with the transportation plan and trails map..." and to this end the township requires dedication of land for transportation and recreation purposes; and

WHEREAS, Grantor further intends, as owner of the Property, to convey to Grantee the right to preserve and protect the Recreation and Transportation values of the Trail Easement Area in perpetuity; and

WHEREAS, Grantee is a publicly-supported, tax-exempt non-profit organization, qualified under Section 501(c)3 and 170(h) of the Internal Revenue Code, whose primary purpose is the.... ; and

WHEREAS, Grantee agrees by accepting this Easement to honor the intentions of Grantor stated herein and to preserve and protect in perpetuity the Recreation and Transportation Values of the Trail Easement Area for the

Source: Brandywine Conservancy

benefit of this generation and generations to come.

NOW THEREFORE, for and in consideration of the above and the mutual covenants, terms, conditions, restrictions, and promises herein contained, pursuant to the laws of ___[state]___ and in particular __[specific statutory authority]__, and for the further consideration of the sum of Five Dollars ($5.00), lawful money of the United States of America, in hand paid by Grantee to Grantor, the receipt of which is hereby acknowledged, the parties hereto, intending to be legally bound, do hereby mutually agree, grant, convey, and declare as follows:

1. STATEMENT OF GRANT

Grantor hereby voluntarily, unconditionally and absolutely grants and conveys unto Grantee, its successors and assigns, an Easement in Gross and a Declaration of Restrictive Covenants, in perpetuity, over the Trail Easement Area, as more particularly hereinafter set forth exclusively for the purposes of preserving and protecting the present natural, scenic, open space, educational, and recreation and transportation values of the Trail Easement Area (such purposes hereinafter referred to as the "Recreation and Transportation Purposes"). Grantee hereby accepts the Easement and agrees to hold it exclusively for such Recreation and Transportation Purposes.

2. PUBLIC ACCESS

In furtherance of the Transportation and Recreation Purposes of this Easement set forth in Paragraph 1 above, Grantor hereby declares and covenants that the general public shall have and be allowed regular access to the Trail Easement Area for the transportation and recreation scientific, and educational purposes described in sub-paragraph A and subject to the limitations contained in sub-paragraphs B, C, and D of this Paragraph 2.

As used herein, Trail is defined as: A corridor of at least ten (10) feet in width through which passes, or will pass, a trail as part of the _____ Township Comprehensive Trail System or as otherwise authorized by the Township. A trail is to serve transportation and recreation functions for one or more of the following: walkers, runners, bicyclists, horseback riders, and cross-country skiers; trails shall exclude all motorized vehicles except as authorized by the Township for maintenance, management and emergency purposes. Trail Easement Area is defined as: the area (a minimum of twenty (20) feet wide) that contains the trail and is restricted from development which would inhibit the use of the trail.

A. The public shall be permitted access to the "Trail Easement Area", as shown on Exhibit "A", for the following activities, except to the extent that Grantee may determine that such activities are inconsistent with the Conservation Purposes for which this Easement is granted:

(i) Nature study and scientific research, including bird watching and the study of fauna and flora, supervised by an organization described in Section 170(h)(3) of the Internal Revenue Code

(ii) Horseback riding;

(iii) Cross-country skiing;

(iv) Hiking, biking and jogging; and

(v) Painting, sketching, and photography.

B. Public access to the Trail Easement Area shall be restricted to the "Trail Easement Area" as shown on Exhibit "A". Grantee retains the right, as it may deem necessary, in order to preserve and protect the Transportation and Recreation Values of the Trail Easement Area and the Transportation and Recreation Purposes to repair the Trail Easement Area, relocate60 the Trail within the Trail Easement Area, or temporarily prohibit public access to the Trail Easement Area.

C. The activities described in sub-paragraph A of this Paragraph 2 shall be conducted in such a manner as to preserve and protect the Transportation and Recreation Values of the Trail Easement Area, and in this connection the following specific limitations shall apply with respect to use of the Trail Easement Area by the general public and shall be enforceable by Grantor and/or Grantee:

(i) Use of any motorized vehicle or similar mechanical means of locomotion, including automobiles, motorcycles, snowmobiles, or other all-terrain vehicles shall be prohibited;

(ii) Smoking of tobacco or other substances, or lighting of fires of any kind shall be prohibited;

(iii) Consumption of alcoholic beverages or use of any kind of stimulant or drug shall be prohibited;

(iv) Trapping or hunting with firearms, bow and arrow, or any other form of arms or weapons shall be prohibited; and

(v) Overnight camping or sleeping shall be prohibited.

Grantee shall have the right to impose any additional limitations with respect to the Trail Easement Area, as it deems necessary or appropriate in order to preserve and protect the Transportation and Recreation Values of the Trail Easement Area and the Transportation and Recreation Purposes for which this Easement is donated.

D. Grantee shall have the right to require Grantor to keep the Trail Easement Area free from obstructions which prevent reasonable pedestrian (and equestrian) access to and along the Trail Easement Area including but not limited to structures, fences and fallen trees.

3. NOTICE

All notices, consents, approvals, or other communication hereunder shall be in writing and shall be deemed properly given if sent by U.S. certified mail, return receipt requested, addressed to the appropriate party or successor in interest, at the address most recently provided.

4. PROHIBITION OF PUBLIC ACCESS

Nothing herein shall be construed as a grant to the general public, or to a person or persons, the right to enter upon any part of the Grantor's property other than as described in Paragraphs 2, herein. Grantor reserves unto themselves and its successors in title to the Trail Easement

Area, all rights, privileges, powers, and immunities, including the right of exclusive possession and enjoyment, subject only to the terms and covenants of this Easement.

5. ENFORCEMENT RIGHTS OF GRANTEE

A. To accomplish the purposes of this Easement the following rights are conveyed to Grantee by this Easement:

(i) To preserve and protect the Transportation and Recreation Values of the Trail Easement Area;

(ii) To prevent any activity on or use of the Trail Easement Area that is inconsistent with the purpose of this Easement and to require the restoration of such areas or features of the Trail Easement Area that may be damaged by any inconsistent activity or use, pursuant to subparagraphs B, C, and D of this Paragraph 5.

B. In the event that a violation of the terms of this Easement by Grantor or by a third party comes to the attention of Grantee, Grantee shall notify Grantor in writing of such violation and demand corrective action sufficient to cure the violation, and where the violation involves injury to the Trail Easement Area resulting from any use or activity inconsistent with the purposes of this Easement, to restore the portion of the Trail Easement Area so injured. If Grantor fails to cure the violation within thirty (30) days after receipt of such notice thereof from Grantee, or under circumstance where the violation cannot reasonably be assured within the thirty (30) day period, fails to begin curing such violation within the thirty (30) day period, or fails to continue diligently to cure such violation until finally cured, Grantee may bring an action at law or in equity in a court of competent jurisdiction to enforce the terms of this Easement, to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction, to recover any damages to which it may be entitled for violation of the terms of this Easement or injury to any Transportation and Recreation Values protected by the terms of this Easement, including damages for the loss of scenic, aesthetic, or environmental values, and to require the restoration of the Trail Easement Area to the condition that existing prior to any such injury. Without limiting Grantor's liability therefor, Grantee, in its sole discretion, may apply any damages recovered to the cost of undertaking any corrective action on the Trail Easement Area. If Grantee, in its sole discretion, determines that circumstance require immediate action to prevent or mitigate significant damage to the Recreation and Transportation Values of the Trail Easement Area, Grantee may pursue its remedies under this Paragraph 5 without prior notice to Grantor or without waiting for the period provided for cure to expire.

C. Grantee's rights under this Paragraph 5 apply equally in the event of either actual or threatened violations of the terms of this Easement, and Grantor agrees that Grantee's remedies at law for any violation of the terms of this easement are inadequate and that Grantee shall be entitled to the injunctive relief described in this Paragraph, both prohibitive and mandatory, in addition to such other relief to which Grantee may be entitled, including specific performance of the terms of this Easement, without necessity of proving either actual damages or the inadequacy of otherwise available legal remedies.

D. Any costs incurred by Grantee in enforcing the terms of this Easement against Grantor, including, without limitation, costs of suit and attorneys' fees, and any costs or restoration necessitated by Grantor's violation of the terms of this Easement shall be borne by Grantor.

6. MAINTENANCE AND ASSESSMENT OBLIGATIONS OF GRANTEE

Note: Obligations may vary depending on whether the municipality holds the Trail Easement Area by easement or by ownership. If it holds the area by ownership or if it agrees through the easement to accept responsibilities, it is responsible for maintenance and assessment. In general, the municipality should be prepared to accept maintenance responsibilities except where the trail is on high traffic-generating properties much as commercial higher density residential or institutional properties for example municipally owned trails are generally not assessed taxes. Where trail easement areas remain in private ownership, the municipality should support waiver of assessment by county assessment offices.

Grantee shall be [if trail is to be publicly owned and maintained] under no obligation to maintain the Trail Easement Area, or any portion thereof, or pay taxes or assessments thereon. Any action by Grantee such as maintenance of the Trail Easement Area or any other act by Grantor [Grantee-if privately held] to protect the Trail Easement Area shall be deemed merely a gratuitous act which shall create no obligation on the part of Grantor [Grantee].

7. SUCCESSORS IN INTEREST

Except where the context requires otherwise, the term "Grantor" and "Grantee", as used in this instrument, and any pronouns used in place thereof, shall mean and include, respectively, Grantor and his personal representatives, heirs, successors in title, and assigns, and Grantee and its successors and assigns.

8. STATEMENT OF COMPLIANCE

Grantor hereby agrees to request in writing at least thirty (30) days prior to the sale, transfer, or long term [ten (10) years or more] lease of the property containing the Trail Easement Area, or any portion thereof, a written instrument from Grantee stating that Grantor is in compliance with the terms and conditions of this Easement, or if Grantor is not in compliance with the terms and conditions of this Easement, stating what violations of this Easement exist. Grantee agrees in such cases or at any other time to acknowledge, execute, and deliver to Grantor or to any mortgagee, transferee, purchaser, or lessee such a written instrument concerning compliance within thirty (30) days of written request from Grantor. Grantor shall

provide a copy of Grantee's compliance statement to any purchaser, mortgagee, lessee, or assignee and shall advise Grantee in writing at least ten (10) days in advance of any transfer, long term lease, or sale of the Trail Easement Area, or any portion thereof. Any costs incurred by Grantee in determining compliance and advising Grantor as to compliance or costs incurred as a result of Grantor's failure to notify Grantee of transfer, sale, assignment, or long term lease of the Trail Easement Area, or any portion thereof, shall be paid by Grantor, [if the municipality does not agree to absorb such costs] his successors or assigns.

9. LIMITATION OF GRANTOR LIABILITY

Grantor, and each subsequent owner of the Trail Easement Area, shall have no personal liability for the observance or performance of the covenants and obligations of Grantor hereunder after such party has conveyed his, her, its, or their interest in the Trail Easement Area, provided that the provisions of Paragraph 8, above, have been fulfilled and all obligations thereunder discharged.

10. HOLD HARMLESS

Grantee, and each subsequent holder of the Trail Easement Area, shall hold harmless, indemnify, and defend Grantor and its heirs, personal representatives, successors, and assigns from and against all liability, penalties, costs, losses, damages, expenses, causes of action, claims, demands, or judgements, including, without limitation, reasonable attorneys' fees, arising from or in any way connected with: (1) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Trail Easement Area, regardless of cause, unless due solely to the gross negligence or willful misconduct of the Grantor and its heirs, personal representatives, successors, and assigns; (2) the obligations specified in Paragraph 6, herein; and (3) the existence or administration of this Easement.

11. STIPULATED VALUE OF GRANTEE'S INTEREST

A. Grantor acknowledges that this Easement constitutes a real property interest in the Trail Easement Area immediately vested in Grantee, and that such interest has a fair market value. For purposes of allocating net proceeds in an extinguishment of all or part of this Easement pursuant to Paragraph 12 herein, the share of Grantee's interest shall not be less than the percentage that the fair market value of this Easement on the date hereof bears to the fair market value of the Trail Easement Area prior to considering the effects of this Easement (hereinafter called the "Easement Percentage").

The values for calculating the Easement Percentage shall be based upon a Qualified Appraisal obtained by Grantor for federal income tax purposes. Upon receipt of such Qualified Appraisal, Grantor shall provide a copy of the Qualified Appraisal to Grantee. In the event that Grantor does not obtain a Qualified Appraisal, the Easement Percentage shall be thirty five (35) percent of fair market value.

B. Grantor and Grantee, and any successors in interests, shall exhaust all legal remedies in order to preserve and protect the Transportation and Recreation Purposes of this Easement. Grantor shall cooperate with Grantee in Grantee's performance of its obligations under this Paragraph 11.

C. In the event that all or part of this Easement is taken in exercise of eminent domain by public, corporate, or other authority so as to abrogate the transportation and recreation goals imposed by this Easement, Grantor and Grantee shall join in appropriate action at the time of such taking to recover the full value of the taking and all incidental or direct damages resulting from the taking. All reasonable expenses incurred by Grantor and Grantee in an effort to prevent a taking or in an effort to recover the full value of a taking shall be shared on an equal basis out of any recovered proceeds except in the event that (i) Grantor and Grantee agree in writing to an alternative means for sharing such expenses, or (ii) all or part of this Easement is extinguished as a result of a judicial proceeding brought by or on behalf of Grantor which, in that event, then all expenses shall be paid by Grantor.

12. EXTINGUISHMENT OF EASEMENT AND DISTRIBUTION OF NET PROCEEDS

A. In the event that all or part of the Trail Easement Area interests subject to this Easement are involuntarily extinguished by (i) an action in eminent domain, (ii) other judicial proceedings, or (iii) settlement is reached between Grantor, Grantee, and condemner under threat of condemnation, and Grantor joins with Grantee in accordance with Paragraph 11.B. and 11.C. above, Grantee's share of any proceeds recovered from any compensation in eminent domain or judicial proceedings or from the first lawful sale of the Trail Easement Area, after the restrictions within this Easement have been extinguished, shall equal the Easement Percentage, provided that a larger percentage has not been stipulated by agreement between Grantee and Grantor.

B. In the event that all or part of the Trail Easement Area interests subject to this Easement are extinguished by (i) an action in eminent domain, (ii) other judicial proceedings, or (iii) settlement is reached between Grantor, Grantee, and condemner under threat of condemnation, where such action is brought by or on behalf of Grantor or where Grantor does not join with Grantee in accordance with Paragraph 11.B. and 11.C. above, the value of the interests so taken shall be determined by an independent appraisal and the net proceeds recovered from any compensation in eminent domain or judicial proceedings or from the first lawful sale of the Trail Easement Area after the restrictions within this Easement have been extinguished, shall be distributed between Grantor and Grantee in accordance with the findings of an independent appraisal of the interests taken which has been conducted

by a Qualified Appraiser. Provided, however, that in no event shall Grantee's share of said net proceeds be less than the Easement Percentage.

C. Grantee shall use its share of any net proceeds recovered, as described in this Paragraph 12, exclusively for the protection or acquisition of interests in land or for Transportation and Recreation Purposes or for improvement to the trails system.

For purposes of this Paragraph, proceeds shall not include an amount equal to the fair market value of any Improvements by the Grantor to the Trail Easement Area affected by the condemnation or judicial action or any improvements to the Trail Easement Area by the Grantee, which were not included in the calculations by which the Easement Percentage was established.

13. FAILURE OF GRANTEE TO ENFORCE

If at any time any organization, agency, or person having rights or duties hereunder as Grantee shall fail to enforce the restrictions set forth in this Easement, Grantor, or any governmental unit of County, shall have the right to bring suit against Grantee for specific performance.

14. TRANSFER OF GRANTEE'S INTEREST

A. Grantee, its successors and assigns, shall have the right to assign either wholly or partially its right, title, and interest hereunder only to an organization able to enforce the restrictions contained herein which has purposes similar to those of Grantee, and which encompasses the purposes set forth in this Easement. Such an organization must at the time of the assignment be a governmental unit qualified organization within the meaning of Section 170(h)(3) of the Internal Revenue Code of 1986 (or its successor provisions), hereinafter the "Code", and one which is organized or operated primarily or substantially for one of the conservation purposes specified in Section 170(h)(4)(A) of the Code. Any transfer or assignment of benefits by Grantee, its successors or assigns, must require the transferee or assignee to carry out the Transportation and Recreation Purposes of this Easement.

B. In the event Grantee shall cease to exist or to be a qualified organization as described in Subparagraph 14.A., herein, its rights and duties hereunder shall become vested in and fall upon one of the following named entities, or such other qualified organization as may then be determined, to the extent such entity shall evidence acceptance of and agree to fully enforce same:

(i) _____ Land Trust;
(ii) _____ Valley Association;
(iii) The Nature Conservancy;
(iv) _____ Watershed Association;
(v) The Township(s) of _____, political subdivision(s) of _____ County and the Commonwealth of Pennsylvania;
(vi) _____ County, a political subdivision of the Commonwealth of Pennsylvania; or
(vii) Such other organizations as may be designated under the doctrine of cy pres by a court of competent jurisdiction; provided, however, that at the time of such designation, such entity shall be an organization as described in Subparagraph 14.A. herein.

[Use the following paragraph only if funds were received by a private organization or a municipality as Grantee.]

C. Upon the occurrence of any transfer or assignment of this Easement, Grantee shall also transfer to the transferee or assignee the then-value of any endowment funds received by Grantee from Grantor to support Grantee's obligation to monitor and enforce of this Easement, and the transferee shall hold such funds for such purposes and be subject to the provisions of this subparagraph C.

15. EASEMENT IN PERPETUITY

The provisions hereof shall inure to and be binding upon the heirs, executors, administrators, devises, successors, and assigns, as the case may be, of the parties hereto and shall be covenants running with the land in perpetuity.

16. SEVERABILITY

This Easement shall be construed in its entirety, however, in the event that any provision or restriction of this Easement or the application thereof to any person or circumstance is found to be invalid, the remainder of the provisions and restrictions of this Easement, and the application of such provision or restriction to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

17. ACKNOWLEDGEMENTS

A. Grantor attests that Grantor is the owner of the Trail Easement Area and that the Trail Easement Area is not subject to a mortgage as of the date of this Easement. [Alternatively, a subordination agreement from the mortgagor for the Trail Easement Area must be obtained. Most mortgage companies will do so if the mortgage is for less than property value.]

IN WITNESS WHEREOF, and again stating their intention to be legally bound hereby, the said parties have hereunto set their hands and respective seals on the day and year first above written.

WITNESS_____
WITNESS_____

BY_____

(SEAL)

ATTEST_____

_____)
_____) ss.
_____)

BE IT REMEMBERED that on this day of_____, 199__, personally appeared before me, the Subscriber, a Notary Public for the State and County aforesaid, _____, party to this Indenture, known to me personally to be such, and severally acknowledged this Indenture to be their deed.

GIVEN under my hand and seal of office, the day and year aforesaid.

Notary Public

_____)
_____) ss.
_____)

BE IT REMEMBERED that on this day of _____, 199__, personally appeared before me, the Subscriber, a Notary Public for the State and County aforesaid,_____, President of Brandywine Conservancy, Inc., a corporation existing under the laws of the State of Delaware, party to this Agreement, and acknowledge this Indenture to be his act and deed and the act and deed of said corporation; that the signature of the President thereto is in his own proper handwriting and the seal affixed is the common and corporate seal of said corporation, and that his act of sealing, executing, acknowledging and delivering said Indenture was duly authorized by a resolution of the Board of Directors of said corporation.

GIVEN under my Hand and Seal of Office, the day and year aforesaid.

Notary Public

Appendix IX.
Trail Construction Costs

TRAIL CONSTRUCTION COSTS

Type of Work	Unit	Cost per Unit
Surveying/Staking	1,000 LF	$15,000
Clearing/Stump Removal	acre	8,000
Grading (10' wide trail bed)	1,000 LF	10,000
Culvert (8" galvanized steel, 10' long)	each	300
Check Dam	each	200
Seeding (by hand)	acre	2,000
Wood Chip Tread (6' wide)	1,000 LF	1,300
Crushed Stone Tread (6' wide)	1,000 LF	7,500
2" thick asphalt tread (6' wide)	1000 LF	12,000
Large Sign (wood face and post)	each	200
Small Sign (wood face and post)	each	100
Bench (wood with iron frame)	each	400
Trash Can (fiberglass)	each	250

LF = linear feet

Appendix X: Federal Highway Administration Funding for Bicycle and Pedestrian Projects

Federal Highway Administration
Funding for Bicycle and Pedestrian Projects

Bicycle and pedestrian projects are broadly eligible for funding from most of the major Federal-aid highway, transit, safety, and other programs. Bicycle projects must be "principally for transportation, rather than recreation, purposes" and must be designed and located pursuant to the transportation plans required of States and Metropolitan Planning Organizations.

FEDERAL-AID HIGHWAY PROGRAM

National Highway System funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System including Interstate highways.

Surface Transportation Program (STP) funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or nonconstruction projects (such as maps, brochures, and public service announcements) related to safe bicycle use and walking. TEA-21 adds "the modification of public sidewalks to comply with the Americans with Disabilities Act" as an activity that is specifically eligible for these funds.

Ten percent of each State's annual STP funds are set aside for ***Transportation Enhancement Activities (TEAs)***. The law provides a specific list of activities that are eligible TEAs and this list includes "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails)."

Another 10 percent of each State's STP funds is set aside for the ***Hazard Elimination and Railway-Highway Crossing programs***, which address bicycle and pedestrian safety issues. Each State is required to implement a Hazard Elimination Program to identify and correct locations that may constitute a danger to motorists, bicyclists, and pedestrians. Funds may be used for activities including 1) a survey of hazardous locations and 2) projects on any publicly owned bicycle or pedestrian pathway or trail, or 3) any safety-related traffic calming measure. Improvements to railway-highway crossings "shall take into account bicycle safety."

Congestion Mitigation and Air Quality Improvement Program funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or nonconstruction projects (such as maps, brochures, and public service announcements) related to safe bicycle use.

Recreational Trails Program funds may be used for all kinds of trail projects. Of the funds apportioned to a State, 30 percent must be used for motorized trail uses, 30

percent for nonmotorized trail uses, and 40 percent for diverse trail uses (any combination).

Provision for pedestrians and bicyclists are eligible under the various categories of the ***Federal Lands Highway Program*** in conjunction with roads, highways, and parkways. Priority for funding projects is determined by the appropriate Federal Land Agency or Tribal government.

National Scenic Byways Program funds may be used for construction of a facility along a scenic byway for pedestrians and bicyclists.

Job Access and Reverse Commute Grants are available to support projects, including bicycle-related services, designed to transport welfare recipients and eligible low-income individuals to and from employment.

High Priority Projects and Designated Transportation Enhancement Activities identified by TEA-21 include numerous bicycle, pedestrian, trail, and traffic calming projects in communities throughout the country.

FEDERAL TRANSIT PROGRAM

Title 49 U.S.C. (as amended by TEA-21) allows the ***Urbanized Area Formula Grants, Capital Investment Grants and Loans,*** and ***Formula Program for Other than Urbanized Area*** transit funds to be used for improving bicycle and pedestrian access to transit facilities and vehicles. Eligible activities include investments in "pedestrian and bicycle access to a mass transportation facility" that establishes or enhances coordination between mass transportation and other transportation.

TEA-21 also created a ***Transit Enhancement Activity*** program with at 1 percent set-aside of Urbanized Area Formula Grant funds designated for, among other things, pedestrian access and walkways, and "bicycle access, including bicycle storage facilities and installation equipment for transporting bicycles on mass transportation vehicles."

HIGHWAY SAFETY PROGRAMS

Pedestrian and bicyclist safety remain priority areas for ***State and Community Highway Safety Grants*** funded by the Section 402 formula grant program. A State is eligible for these grants by submitting a Performance plan (establishing goals and performance measures for improving highway safety) and a Highway Safety Plan (describing activities to achieve those goals.)

Research, development, demonstrations, and training to improve highway safety (including bicycle and pedestrian safety) is carried out under the Highway Safety Research and Development (Section 403) program.

FEDERAL/STATE MATCHING REQUIREMENTS

In general, the Federal share of the costs of transportation projects is 80 percent with a 20 percent State or local match. However, there are a number of exceptions to this rule.

- Federal Lands Highway projects and Section 402 Highway Safety funds are 100 percent federally funded.
- Bicycle-related Transit Enhancement Activities are 95 percent federally funded.
- Hazard elimination projects are 90 percent federally funded. Bicycle-related transit projects (other than Transit Enhancement Activities) may be up to 90 percent federally funded.
- Individual Transportation Enhancement Activity projects under the STP can have a Federal match higher or lower than 80 percent. However, the overall Federal share of each State's Transportation Enhancement Program must be 80 percent.
- States with higher percentages of Federal Lands have higher Federal shares calculated in proportion to their percentage of Federal lands.
- The State and/or local funds used to match Federal-aid highway projects may include in-kind contributions (such as donations). Funds from other Federal programs may also be used to match Transportation Enhancement, Scenic Byways, and Recreational Trails program funds. A Federal agency project sponsor may provide matching funds to Recreational Trails funds provided the Federal share does not exceed 95 percent.

Appendix XI:
Code of Virginia
Section 29.1-509
The Liability Law

Virginia Code § 29.1-509
Duty of care and liability for damages of landowners to hunters, fishermen, sightseers, etc.

A. For the purpose of this section:

"Fee" means any payment or payments of money to a landowner for use of the premises or in order to engage in any activity described in subsections B and C of this section, but does not include rentals or similar fees received by a landowner from governmental sources or payments received by a landowner from incidental sales of forest products to an individual for his personal use, or any action taken by another to improve the land or access to the land for the purposes set forth in subsections B and C of this section or remedying damage caused by such uses.

"Land" or "premises" means real property, whether rural or urban, waters, boats, private ways, natural growth, trees and any building or structure which might be located on such real property, waters, boats, private ways and natural growth.

"Landowner" means the legal title holder, lessee, occupant or any other person in control of land or premises.

B. A landowner shall owe no duty of care to keep land or premises safe for entry or use by others for hunting, fishing, trapping, camping, participation in water sports, boating, hiking, rock climbing, sightseeing, hang gliding, skydiving, horseback riding, foxhunting, racing, bicycle riding or collecting, gathering, cutting or removing firewood, for any other recreational use, or for use of an easement granted to the Commonwealth or any agency thereof to permit public passage across such land for access to a public park, historic site, or other public recreational area. No landowner shall be required to give any warning of hazardous conditions or uses of, structures on, or activities on such land or premises to any person entering on the land or premises for such purposes, except as provided in subsection D.

C. Any landowner who gives permission, express or implied, to another person to hunt, fish, launch and retrieve boats, swim, ride, foxhunt, trap, camp, hike, rock climb, hang glide, skydive, sightsee, engage in races, to collect, gather, cut or remove forest products upon land or premises for the personal use of such person, or for the use of an easement as set forth in subsection B does not thereby:

1. Impliedly or expressly represent that the premises are safe for such purposes; or

2. Constitute the person to whom such permission has been granted an invitee to whom a duty of care is owed; or

3. Assume responsibility for or incur liability for any intentional or negligent acts of such person or any other person, except as provided in subsection D.

D. Nothing contained in this section, except as provided in subsection E, shall limit the liability of a landowner which may otherwise arise or exist by reason of his gross negligence or willful or malicious failure to guard or warn against a dangerous condition, use, structure, or activity. The provisions of this section shall not limit the liability of a landowner which may otherwise arise or exist when the landowner receives a fee for use of the premises or to engage in any activity described in subsections B and C of this section. Nothing contained in this section shall relieve any

sponsor or operator of any sporting event or competition including but not limited to a race or triathlon of the duty to exercise ordinary care in such events.

E. For purposes of this section, whenever any person enters into an agreement with, or grants an easement to, the Commonwealth or any agency thereof, any county, city, or town, or with any local or regional authority created by law for public park, historic site or recreational purposes, concerning the use of, or access over, his land by the public for any of the purposes enumerated in subsections B and C of this section, the government, agency, county, city, town, or authority with which the agreement is made shall hold a person harmless from all liability and be responsible for providing, or for paying the cost of, all reasonable legal services required by any person entitled to the benefit of this section as the result of a claim or suit attempting to impose liability. Any action against the Commonwealth, or any agency, thereof, for negligence arising out of a use of land covered by this section shall be subject to the provisions of the Virginia Tort Claims Act (§8.01-195.1 et seq.). Any provisions in a lease or other agreement which purports to waive the benefits of this section shall be invalid, and any action against any county, city, town, or local or regional authority shall be subject to the provisions of §15.2-1809, where applicable.

Appendix XII:
Equine Documents

Approved March 20, 1991

Be it enacted by the General Assembly of Virginia:
1. That the Code of Virginia is amended by adding in Title 3.1 a chapter numbered 27.5, consisting of sections numbered 3.1-796.130 through 3.1-796.133 as follows:

CHAPTER 27.5.
EQUINE ACTIVITY LIABILITY ACT

§ 3.1-796.130. Definitions. - As used in this chapter, unless the context requires a different meaning:

"Directly engages in an equine activity" means a person who rides, trains, drives, or is a passenger upon an equine, whether mounted or unmounted, but does not mean a spectator at an equine activity or a person who participates in the equine activity but does not ride, train, drive, or ride as a passenger upon an equine.

"Equine" means a horse, pony, mule, donkey, or hinny

"Equine activity" means (i) equine shows, fairs, competitions, performances, or parades that involve any or all breeds of equines and any of the equine disciplines, including, but not limited to, dressage, hunter and jumper horse shows, grand prix jumping, three-day events, combined training, rodeos, driving, pulling, cutting, polo, steeple chasing, endurance trail riding, and western games, and hunting; (ii) equine training or teaching activities; (iii) boarding equines; (iv) riding, inspecting, or evaluating an equine belonging to another whether or not the owner has received some monetary consideration or other thing of value for the use of the equine or is permitting a prospective purchaser of the equine to ride, inspect, or evaluate the equine; and (v) rides, trips, hunts, or other equine activities of any type however informal or impromptu that are sponsored by an equine activity sponsor.

"Equine activity sponsor" means any person or his agent who, for profit or not for profit sponsors, organizes, or provides the facilities for an equine activity, including but not limited to pony clubs, 4-H clubs, hunt clubs, riding clubs, school- and college-sponsored classes and programs, therapeutic riding programs, and operators, instructors, and promoters of equine facilities, including but not limited to stables, clubhouses, ponyride strings, fairs, and arenas at which the activity is held.

"Equine professional" means a person or his agent engaged for compensation in (i) instructing a participant or renting to a participant an equine for the purpose of riding, driving, or being a passenger upon an equine of (ii) renting equipment or tack to a participant.

"Participant" means any person, whether amateur or professional, who directly engages in an equine activity, whether or not a fee is paid to participate in the equine activity.

§ 3.1-796.131. Horse racing excluded. - The provisions of this chapter shall not apply to horse racing, as that term is defined by § 59.1-365.

§ 3.1-796.132. Liability limited; liability actions prohibited. - A. Except as provided in § 3.1-796.133, an equine activity sponsor or an equine professional shall not be liable for an injury to or death of a participant engaged in an equine activity.

B. Except as provided in § 3.1-796.133, no participant or parent or guardian of a participant who has knowingly executed a waiver of his rights to sue or agrees to assume all risks specifically enumerated under this subsection may maintain an action against or recover from an equine activity sponsor or an equine professional for an injury to or the death of a participant engaged in an equine activity. The waiver shall give notice to the participant of the risks inherent in equine activities, including (i) the propensity of an equine to behave in dangerous ways which may result ininjury to the participant; (ii) the inability to predict an equine's reaction to sound, movements, objects, persons, or animals; and (iii) hazards of surface or subsurface conditions. The waiver shall remain valid unless expressly revoked by the participant or parent or guardian of a minor. In the case of school and college sponsored classes and programs, waivers executed by a participant or parent or guardian of a participant shall apply to all equine activities in which the participant is involved in the next succeeding twelve month period unless earlier expressly revoked in writing.

§ 3.1-796.133. Liability of equine activity sponsors, equine professionals. - No provision of this chapter shall prevent or limit the liability of an equine activity sponsor or equine professional who:

1. Intentionally injures the participant
2. Commits an act or omission that constitutes negligence for the safety of the participant and such act or omission caused the injury, unless such participant, parent, or guardian has expressly assumed the risk causing the injury in accordance with § 3.1-796.132 B; or
3. Knowingly provides faulty equipment or tack and such equipment or tack causes the injury or death of the participant.

Equine Activity Release, Waiver or Right of Sue And Assumption of All Risks

The Equine Liability Release, Waiver of Right to Sue and Assumption of All Risks Agreement ("this Agreement") is hereby given by the undersigned to the _____, an equine activity sponsor and to the sponsor as agent for and for the benefit of each owner of land upon which an equine activity to which this Agreement relates is conducted ("owner") and each partner, officer, agent, employee, director, shareholder, member, heir, personal representative, successor and assign of the sponsor and of each owner (who shall be included within the words "sponsor" or "owner" as their relationships may determine) provides as follows:

In consideration for the opportunities provided by the sponsor and each owner to the undersigned "participant" (including any minor participant for whom he signs this Agreement) for the enjoyment of equine activities as a participant, the undersigned "participant" (including any minor participant for whom he signs this agreement) hereby agrees as follows:

1. This Agreement is given under the Virginia Equine Activity Liability Act (Code of Virginia § 3.1-796.130 et seq) and the Duty of Care and Liability for Damages of Landowners to Hunters, Fisherman, Sightseers, ect (§ 29.1.509), as they may now provide or be hereafter amended (the "Acts"). All terms defined by the Acts shall have the same meaning herein, and the Acts are hereby incorporated in this Agreement by reference. This Agreement shall be so construed as to provide to the sponsor and owner the fullest protection of a release, waiver of right to sue and assumption of all risks which is afforded to the sponsor and owners by the Acts.

2. All pronouns shall be construed to include the masculine, feminine or neuter as well as the plural or singular, as may be appropriate to facilitate the construction of this Agreement in the light of the facts presented.

3. The participant hereby acknowledges that he has full and complete notice and understanding of the Acts and of all the risks inherent in equine activities which may cause, contribute to or result in the death or personal injury of the participant or damage to the participant's property (the "Risks"), including but not limited to:

   (i) the propensity of an equine to behave in dangerous ways or to trip and/or fall;

   (ii) the inability of anyone whomsoever to predict or foresee an equine's reaction to excitement, weather conditions, sound, movements, objects, persons, animals, reptiles, birds or insects, and the effects of such reactions;

   the hazards of surface or subsurface conditions, including but not limited to objects or conditions on, under or protruding from the surface, both latent and patent;

   the hazards which rocks, cliffs, hills, fences, trees, stumps, logs, bridges, ditches and other debris and obstacles, and any equine activity in connection therewith, may foreseeably or unforeseeably present;

   (v) the dangers and risks of becoming entangled in tack, harness, or vehicles used in an equine activity for any reason whatsoever or for no identifiable reason and

   any negligent act or omission by the sponsor or any owner which causes or results in the death or personal injury of the participant or damage to the participant's property.

4. **The participant hereby RELEASES and WAIVES all rights which he may have or hereafter have against the sponsor and each owner for death, personal injury or property damage which is in any way associated with the Risks; he does hereby WAIVE his right to sue or to bring any action against the sponsor and each owner from and to HOLD the sponsor and each owner HARMLESS against any such suit or action; and he hereby expressly ASSUMES ALL RISKS AND DANGERS of death, personal injury and property damage which are in any way associated with the Risks enumerated in paragraph 3, above.**

5. **The participant hereby authorizes and consents to any emergency medical care, which may at the time, appear reasonably appropriate under the circumstances as a result of injury or sickness caused by or incurred in the course of an equine activity.**

6. I agree to abide by all of the rules of the _____. I understand that distance riding involves being in remote areas for extended periods of time, far from communications, transportation, and medical facilities; that these areas have many natural and man made hazards, which facility management cannot anticipate, identify, modify, or eliminate. I agree to take full responsibility for myself and the animal I am riding.

7. This Agreement shall remain valid and in full force and effect from and after the date opposite the signature of the participant until expressly revoked by the participant in a written notice personally delivered to the sponsor.

8. To the extent possible, this Agreement shall be construed in such manner as will render it, and each provision of it, fully enforceable; but if any provision of this Agreement shall be unenforceable, such provision (or so much thereof as in unenforceable) shall be deleted and the remainder of this agreement shall continue in full force and effect.

9. If this Agreement is executed by the undersigned participant for and on behalf of a minor participant named below, the undersigned participant hereby warrants and represents that he is in fact the legal parent or guardian of such minor, with full rights of custody and control; that this Agreement is given on behalf of and is intended to be binding upon said minor participant, his heirs, personal representatives, successors and assigns; and the undersigned participant as if it were entered into solely on his own behalf.

10. This Agreement shall be binding upon the heirs, personal representatives, successors and assigns of the participant.

11. I have fully read and fully understand the foregoing Equine Liability Release, Waiver of Right to Sue and Assumption of All Risks. I have consulted and relied upon my own advisors on all questions in connection therewith, and I have not relied upon the sponsor or any owner for advice or explanation in connection therewith.

Print Name: _____ Date:
Participant

Signature: _____

Print name of the minor participant for whom you are signing, if any.

_____

RULES AND REGULATIONS

2 VAC 5-70-10 through 2 VAC 5-70-50
(Previously VR 115-02-05)

Pertaining to the

HEALTH REQUIREMENTS GOVERNING THE CONTROL OF EQUINE INFECTIOUS ANEMIA IN VIRGINIA

Virginia Department of Agriculture
and Consumer Services

DIVISION OF ANIMAL INDUSTRY SERVICES
Office of Veterinary Services
P. O. Box 1163
Richmond, VA 23218
804-786-2483

RULES AND REGULATIONS

Pertaining to the Health Requirements Governing the Control of Equine Infectious Anemia in Virginia

(Previously VR 115-02-05)

Promulgated Pursuant to

Sections 3.1-724 through 3.1-730

of the

Code of Virginia of 1950

Adopted November 27, 1985
Reprinted June 1998

REGULATIONS 2 VAC 5-70-10 through 2 VAC 5-70-50

Pertaining to the
HEALTH REQUIREMENTS GOVERNING THE CONTROL OF EQUINE INFECTIOUS ANEMIA IN VIRGINIA

Pursuant to the authority in Sections 3.1-724 through 3.1-730 of the Code of Virginia (1950) as amended, the Board of Agriculture and Consumer Services hereby adopts the following Rules and Regulations relating to the Health Requirements Governing the Control of Equine Infectious Anemia in Virginia.

2 VAC 5-70-10. Definitions.

The following words and terms, when used in these regulations, shall have the following meaning, unless the context clearly indicates otherwise:

"Accredited veterinarian" means a licensed veterinarian approved by the United States Department of Agriculture/Animal and Plant Health Inspection Service (hereinafter referred to as USDA-APHIS) and State Veterinarian.

"Approved laboratory" means a laboratory approved by USDA-APHIS or the State Veterinarian to conduct the official test for equine infectious anemia.

"Approved veterinarian" means a state-federal regulatory veterinarian, an accredited veterinarian, or other veterinarian approved by the State Veterinarian for special testing.

"Department" means the Virginia Department of Agriculture and Consumer Services.

"Equine Infectious Anemia" (EIA or Swamp Fever) means a contagious and infectious disease of horses, characterized by a variety of symptoms related to anemia. It may be acute, subacute, or chronic in nature and may terminate in death. The virus remains in the blood of infected animals throughout their lifetime. The virus may be spread from horse to horse via biting flies, mosquitoes, hypodermic needles, or blood-letting procedures.

"Horse" includes all horselike animals embracing all members of the equine species including horses, ponies, the asinine species, and burros. It also includes hybrid offspring of the equine and asinine species by whatever name they may be known, such as mules, hinnies, and donkeys.

"Interstate health certificate" means a legible record covering the health requirements for importing horses into Virginia, executed on an approved form of the state of origin, and bearing the endorsement of the livestock health official of that state.

"Licensed veterinarian" means a veterinarian who has graduated from a recognized college of veterinary medicine and has been examined and found proficient by the Virginia State Board of Veterinary Medicine.

"Official test" means the agar gel immunodiffusion test (Coggins AGID).

"Reactor" means a horse over eight (8) months of age that reacts positively to an official test performed by an approved laboratory.

"State-Federal Regulatory Veterinarian" means a veterinarian employed by the State Veterinarian or USDA-APHIS.

"State Veterinarian" means a Virginia Department of Agriculture and Consumer Services veterinarian employed by the Commissioner of Agriculture and Consumer Services who is responsible for the animal health programs in the Commonwealth of Virginia.

"Veterinary services" means services of USDA, APHIS.

2 VAC 5-70-20. Testing requirements for horses exhibited at shows, fairs, or other exhibitions in Virginia.

All horses assembled at a show, fair, race, meet, or other such function in Virginia, must be accompanied by a report of an official negative test for equine infectious anemia conducted within 12 months prior to such event. The person in charge will ensure that a copy of the official negative test results accompanies each horse in the event and shall make such reports available for inspection by a representative of the State Veterinarian upon request. The person in charge shall exclude any horse which is not accompanied by a negative test report.

2 VAC 5-70-30. Alternate testing requirements for horses assembled for sale or auction in Virginia.

Horses may be assembled at a sale or auction without a negative test for equine infectious anemia, provided that the State Veterinarian so approves, and that the following requirements are met:

A. All horses, while assembled at the sale or auction, shall have blood samples drawn for equine infectious anemia testing.

B. Horses consigned or sold for immediate slaughter to an official slaughtering establishment are exempt from equine infectious anemia testing. Such horses shall be identified in a manner approved by the State Veterinarian, and a written permit shall be issued for their transfer to the slaughtering establishment.

C. The owner or manager of the sale or auction shall employ a licensed accredited veterinarian, who shall draw blood samples from all horses required to be tested, and shall record all visible markings or other permanent identification for each horse bled.

D. The owner or manager shall announce, prior to the sale or auction, that all non-slaughter horses will be tested. Each buyer of a non-slaughter horse or horses at the sale or auction shall sign a release form, signifying his agreement to maintain such horse or horses at a specified location until notified of the results of the test. Horses that prove negative to the test may move in normal trade channels. Owners of horses that react to the test must comply with section 2 VAC 5-70-40 of this regulation.

E. The State Veterinarian may grant such exceptions to these requirements as he feels the circumstances warrant and that are not in variance with other rules and regulations of the Commonwealth of Virginia.

2 VAC 5-70-40. Reactors to the official test.

A. Horses which have reacted positive to the official test shall be quarantined to the premises where tested by a State-Federal Regional Veterinarian.

B. When a reactor is disclosed on a premises, and such testing does not constitute a complete herd test, then all horses on such premises shall be tested, including the test-positive animal. The required testing will be for the purpose of detecting additional infection and to confirm the identity of the reactors. Such testing will be performed under the supervision of a representative of the State Veterinarian. Additional testing may be required by the State Veterinarian to clarify the equine infectious anemia status of horses on the premises.

C. Reactor animals shall be permanently identified by a freeze brand, using the official Commonwealth of Virginia code identification (52A) placed under the mane. The branding of such reactors will be performed by or under the supervision of a representative of the State Veterinarian.

D. Negative horses on the premises where a reactor animal is disclosed may not be removed from such premises without the approval of the State Veterinarian.

E. Virginia horses under eight (8) months of age which have reacted to the official test shall be placed under written quarantine and retested when they become eight (8) months of age. If such animals are reactors when they are eight (8) months of age, they shall be subject to the same regulation as the adult infected animal.

F. When a reactor is disclosed, a thorough investigation shall be made to determine the source of disease and to determine whether spread has occurred. Depending upon these findings, additional testing may be required by the State Veterinarian.

2 VAC 5-70-50. Disposition of reactor animals.

A. Reactor horses may be humanely destroyed. The destruction of such horses shall be the owner's responsibility and at his or her expense, but will be done under the supervision of a representative of the State Veterinarian.

B. Reactor horses may be further identified as required by the State Veterinarian and sold:
1. Under permit to an approved slaughter establishment,
2. To a market for sale to an approved slaughter establishment, or
3. For rendering or research purposes.

C. At owner's option, reactor horses may be retained under quarantine and held in isolation from all other horses on the premises. Provisions may be made under terms specified by the State veterinarian for the use of such reactor animals by the owner or his agent in such a manner that there is no risk of spreading equine infectious anemia. The terms and conditions shall be made part of the quarantine document. The restrictions placed on the movement and maintenance of reactor animals shall be permanent or until such animals die, are destroyed, or are cleansed of the carrier state.

D. When reactor animals are quarantined as provided herein, all other horses on the premises may be required to be tested every six (6) months if deemed necessary by the State Veterinarian.

E. Whenever it has been determined that the provisions of the quarantine and isolation are not being maintained, the State Veterinarian may require that all horses on the premises be placed under quarantine. This quarantine shall remain in effect until the State Veterinarian has determined that the threat to the health of other horses no longer exists.

Virginia Department of Agriculture
and Consumer Services
Office of Veterinary Services
P. O. Box 1163
Richmond, VA 23218
804-786-2483
Send original form to appropriate Regional Office

EQUINE EVENT REPORT
(Equidae with Official EIA Test)

Date of Event:

Name of Event:

Location of Event:

I hereby certify that all equidae (horses, mules, etc.) assembled for this event were accompanied by a report of an official negative test for equine infectious anemia conducted within 12 months prior to the event.

Signature - Sale/Show Chairman/Manager

Address (City, State, Zip)

LIST OF EXHIBITING EQUIDAE

No.	Name of Owner	Owner's Address	Equidae Name	Test Date	State	Lab Access. No.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

EQUINE EVENT REPORT (VDACS-03028A) Continuation Sheet

No.	Name of Owner	Owner's Address	Equidae Name	Test Date	State	Lab Access. No.
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
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37						
38						
39						
40						

Virginia Department of Agriculture
and Consumer Services
Office of Veterinary Services
P. O. Box 1163
Richmond, VA 23218
804-786-2483
Send original form to appropriate Regional Office

EQUINE EVENT REPORT
(Equidae [Horses, Mules, etc.] Denied Entry)

Date of Event:

Name of Event:

Location of Event:

I hereby certify that the below listed equidae were denied entry into this event because of improper, falsified, or no report of an official negative test for equine infectious anemia.

Signature - Sale/Show Chairman/Manager

Address (City, State, Zip)

EQUIDAE DENIED ENTRY

No.	Name of Owner	Address	Equidae Name	Reason
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

J. Carlton Courter, III
Commissioner

COMMONWEALTH of VIRGINIA

Department of Agriculture and Consumer Services
Division of Animal Industry Services
Office of Veterinary Services
PO Box 1163, Richmond, Virginia 23218
Phone: 804/786-2483 • Fax: 804/371-2380 • Hearing Impaired: 800/828-1120
http://www.state.va.us/~vdacs/vdacs.htm

September 29, 1998

Mr. Scott Shanklin
Bear Creek State Park
Rt. 1, Box 253
Cumberland, VA 23040

Dear Mr. Shanklin:,

For your information and use, I am enclosing copies of Virginia Regulation VR 115-02-05, Rules and Regulations Pertaining to the Health Requirements Governing the Control of Equine Infectious Anemia (EIA) in Virginia. Note that section 2 of this regulation indicates the responsibilities of management involved in shows, fairs, races, meets, and other such functions as to a required official negative test report for EIA to accompany each horse assembled for the event.

To assist equine event managers in keeping the required report of entries and evidence of a negative EIA test, I have enclosed forms which may be used for this purpose. The report can be easily made at the same time each animal is checked into the event. After the event, the original should be sent to this office, with the event management retaining a copy (xerox or carbon) for their files.

Please note that one of the enclosed forms is for reporting all equines with negative results; i.e., Equine Event Report (Equidae with Official EIA Test), as well as a Continuation Sheet. The other form is to report all horses denied entry because of improper or no official negative test for EIA; i.e., Equine Event Report (Equidae [horses, mules, etc.] Denied Entry. In addition, a sample copy of the official EIA test record is enclosed, with pertinent blocks on the form circled to indicate where the information needed to fill out the Equine Event Report can be found.

Please feel free to make as many copies of the Equine Event Report forms as you need. We appreciate your assistance in protecting Virginia's equine industry, and if you have any questions, please contact us [telephone: (804) 786-2483].

Sincerely,

R. D. Whiting,, D.V.M.
Program Coordinator
Veterinary Services

Enclosures:

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE

EQUINE INFECTIOUS ANEMIA LABORATORY TEST

(VS Memorandum 555.8)

1. ACCESSION NUMBER	2. DATE

3. NAME AND ADDRESS OF OWNER *(Street, City, State and Zip Code)*

Tel. No. · AC (

4. NAME AND ADDRESS WHERE HORSE IS STABLED *(Street, City, State and Zip Code)*

Tel. No. · AC (

5. NAME AND ADDRESS OF VETERINARIAN *(Street, City, State and Zip Code. Print name and address legibly for window envelope use.)*

SAMPLE

6. MARKET TEST ☐ YES ☐ NO

7. NAME AND ADDRESS OF AUCTION MARKET *(Street, City, State and Zip Code)*

Tel. No. · AC (

8. FEDERALLY ACCREDITED VET. ☐ YES ☐ NO

9. STATE IN WHICH LICENSED

I hereby certify that the blood specimen submitted with this form was drawn by me from the horse described below on the date indicated.

10. SIGNATURE OF VETERINARIAN

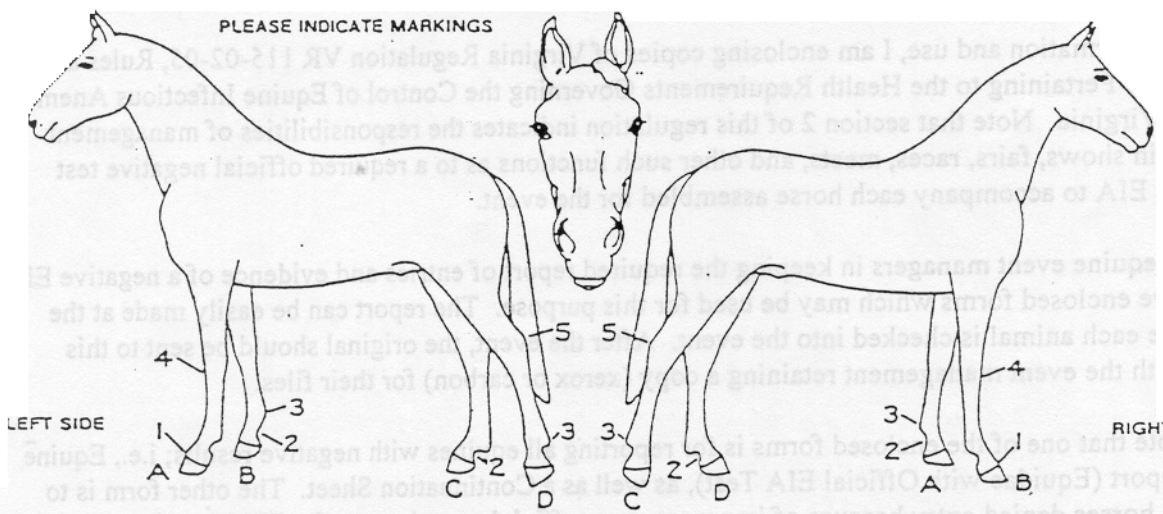
11. TELEPHONE NO. AC (

12. DATE SAMPLE DRAWN

13. IDENTIFICATION DATA

TUBE NO.	OFFICIAL TAG NO.	TATTOO/BRAND NO	NAME OF HORSE	COLOR	REG.NO.	BREED	AGE	* SEX

PLEASE INDICATE MARKINGS



FOR DESCRIPTION GUIDE - HORSES, SEE REVERSE SIDE OF PART 1

14. REASON FOR TESTING *(If other than Equine Infectious Anemia)*

15. DESCRIPTION AND REMARKS *(Left Side)*

SAMPLE

A - LEFT OR NEAR FORE LEG
B - RIGHT OR OFF FORE LEG
C - RIGHT OR OFF HIND LEG
D - LEFT OR NEAR HIND LEG

1 - Coronet
2 - Pastern
3 - Fetlock
4 - Knee
5 - Hock

M - Mare
S - Stallion
G - Gelding
N - Neuter

16. DESCRIPTION AND REMARKS *(Right Side)*

FOR LABORATORY USE ONLY

17. DATE RECEIVED	18. DATE REPORTED	19. TEST RESULT	20. REMARKS

21. NAME OF LABORATORY	22. SIGNATURE

VS FORM 10-11 (APR 90) *Replaces APHIS Form 8011 (JUN 89) which may be used*

PART 1 - VETERINARIAN/SUBMITTER

Appendix XIII: Managing Multiple Use Trail Conflict

Multiple Use Trail Management: Challenges faced by multiple use trail managers

The challenges of multiple use trails focus on user safety, protecting natural resources, and providing high-quality user experiences. Managers can meet the potential challenges through good trail design, information and education efforts and programs, user involvement and regulations and enforcement.

a. Maintain user Safety

Threats to user safety

-collisions and near misses among users and/or vehicles
-reckless and irresponsible behavior
-poor user preparation and judgement
-unsafe conditions related to trail use
-unsafe conditions not related to trail use
-poor trail design, construcction, maintenance or management
-other hazards

Factors to control to improve user safety

-user speed, or speed differential
-mass of user and vehicle
-sight distances
-trail width
-trail surface
-congestion
-users overtaking one other without warning
-trail difficulty
-user skill level and experience
-user espectation an preparedness
-emergency procedures
-on-site managmenet presence

b. Protecting Natural Resources

Minimizing environmental impacts is a high priority. Negative resource impacts not only are undesireable because of Virginia State Park's mission, but also affect user satisfaction.

Factors that influence the amount of resource damage caused by trail use:

-Soil characteristics
-slope
-exposures

-elevation
-type of ecosystem
-type of wildlife
type of vegetation in trail
-type of vegetation and terrain beside trail
-quality of trail design and construction
-le vel of maintenance
-type of use
-concentration or dispersal of use
-season of use
-difficulty of terrain
-up or down hill traffic direction
-style of use or technique

c. Providing High quality experience

Threats to quality experience
-crowding
-conflict--activity styles, resource specificity,mode of experience, tolerance for lifestyle diversity

Moore, Roger L. (1994). Conflicts on Multiple-Use Trails: Synthesis of the Literature and the State of the Practice. Federal Highway Administration, Intermodal Division, FHWA-PD-94-031.

Appendix XIV· Trail Log & Inspection Form

Virginia State Parks
Trail Log and Inspection

Trail Name:_____
Type of Usage:_____
Length:_____
Trail Width:_____
Trail Grade:_____
Surfacing/Tread Material:_____
Difficulty Rating:_____
Design Capacity (circle one): Heavy Moderate Low
Log Completed By:_____ Date:_____

General Conditions/Assessment Inspection Date_____

	Good	Fair	Poor	Notes
Tread/Surface				
Surface Erosion				
Surface Drainage				
Trail Corridor--Vertical & Horizontal				
Usage Limit	(Below)	(Normal)	(Above)	
Blaze Condition				
Sign Condition				

Routine Maintenance Inspection Date_____

	Needed	Not Needed	Done At Inspection	Date Work Completed	Notes
Dead Wood, Brush,Tree Removal					
Pruning, trimming, grooming					
Trash Removal/Pickup					
Grading Tread					
Cleaning/Repair of Drainage Structures					
Sign Repair					
Blaze Repair/Replace					
Vista Maintainence					

Structure Condition Inspection Date

Structure Location (mileage)	Structure Description	Condition of wood good/repair/replace	Condition of hardware good/repair/replace	Is it safe? Y N	List work needed for structure integrity/public safety

Overall Comments/Evaluation:

Inspected By:_____ Date_____

Reviewed By:_____ Date_____

6/1/99

Appendix XV·
Virginia Tort Claims Act

Virginia Tort Claims Act

Title 8.01

§ 8.01-195.1

Short title

This article shall be known and may be cited as the "Virginia Tort Claims Act."

§ 8.01-195.2

Definitions

As used in this article:

"Agency" means any department, institution, authority, instrumentality, board or other administrative agency of the government of the Commonwealth of Virginia and any transportation district created pursuant to Chapter 32 (§ 15.1-1342 et seq.) of Title 15.1 and Chapter 630 of the 1964 Acts of Assembly.

"Employee" means any officer, employee or agent of any agency, or any person acting on behalf of an agency in an official capacity, temporarily or permanently in the service of the Commonwealth, or any transportation district, whether with or without compensation.

"School boards" as defined in §22.1-1 are not state agencies nor are employees of school boards state employees.

"Transportation district" shall be limited to any transportation district or districts which have entered into an agreement in which the Northern Virginia Transportation District is a party with any firm or corporation as an agent to provide passenger rail services for such district or districts while such firm or corporation is performing in accordance with such agreement.

§ 8.01-195.3

Commonwealth, transportation district or locality liable for damages in certain cases

Subject to the provisions of this article, the Commonwealth shall be liable for claims for money only accruing on or after July 1, 1982, and any transportation district shall be liable for claims for money only accruing on or after July 1, 1986, on account of damage to or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee while acting within the scope of his employment under circumstances where the Commonwealth or transportation district, if a private person, would be liable to the claimant for such damage, loss, injury or death. However, except to the extent that a transportation district contracts to do so pursuant to §[illegible], neither the Commonwealth nor any transportation district shall be liable for interest prior to judgment or for punitive damages. The amount recoverable by any claimant shall not exceed (i) $25,000 for causes of action accruing prior to July 1, 1988, $75,000 for causes of action accruing on or after July 1, 1988, or $100,000 for causes of action accruing on or after July 1, 1993, or (ii) the maximum limits of any liability policy maintained to insure against such negligence or other tort, if such policy is in force at the time of the act or omission complained of, whichever is greater, exclusive of interest and costs.

Notwithstanding any provision hereof, the individual immunity of judges, the Attorney General, attorneys for the Commonwealth, and other public officers, their agents and employees from tort claims for damages is hereby preserved to the extent and degree that such persons presently are immunized. Any recovery based on the following claims are hereby excluded from the provisions of this article:

1. Any claim against the Commonwealth based upon an act or omission which occurred prior to July 1, 1982.

1a. Any claim against a transportation district based upon an act or omission which occurred prior to July 1, 1986.

2. Any claim based upon an act or omission of the General Assembly or district commission of any transportation district, or any member or staff thereof acting in his official capacity, or to the legislative function of any agency subject to the provisions of this article.

3. Any claim based upon an act or omission of any court of the Commonwealth, or any member thereof acting in his official capacity, or to the judicial functions of any agency subject to the provisions of this article.

4. Any claim based upon an act or omission of an officer, agent or employee of any agency of government in the execution of a lawful order of any court.

5. Any claim arising in connection with the assessment or collection of taxes.

6. Any claim arising out of the institution or prosecution of any judicial or administrative proceeding, even if without probable cause.

7. Any claim by an inmate of a state correctional facility, as defined in §[illegible], unless the claimant verifies under oath, by affidavit, that he has exhausted his remedies under the adult institutional inmate grievance procedures promulgated by the Department of Corrections. The time for filing the notice of tort claim shall be tolled during the pendency of the grievance procedure.

8. Any claim arising from the failure of a computer, software program, database, network, information system, firmware or any other device, whether operated by or on behalf of the Commonwealth of Virginia or one of its agencies, to interpret, produce, calculate, generate, or account for a date which is compatible with the "Year 2000" date change.

Nothing contained herein shall operate to reduce or limit the extent to which the Commonwealth or any transportation district, agency or employee was deemed liable for negligence as of July 1, 1982, nor shall any provision of this article be applicable to any county, city or town in the Commonwealth or be so construed as to remove or in any way diminish the sovereign immunity of any county, city or town in the Commonwealth.

§ 8.01-195.4

Jurisdiction of claims under this article; right to jury trial; service on Commonwealth or locality

The general district courts shall have exclusive original jurisdiction to hear, determine, and render judgment on any claim against the Commonwealth or any transportation district cognizable under this article when the amount of the claim does not exceed $1,000, exclusive of interest and any attorneys' fees. Jurisdiction shall be concurrent with the circuit courts when the amount of the claim exceeds $1,000 but does not exceed $10,000, exclusive of interest and such attorneys' fees. Jurisdiction of claims when the amount exceeds $10,000 shall be limited to the circuit courts of the Commonwealth. The parties to any such action in the circuit courts shall be entitled to a trial by jury.

In all actions against the Commonwealth commenced pursuant to this article, the Commonwealth shall be a proper party defendant, and service of process shall be made on the Attorney General. The notice of claim shall be filed pursuant to §8.01-195.6 on the Director of the Division of Risk Management or the Attorney General. In all such actions against a transportation district, the district shall be a proper party and service of process and notices shall be made on the chairman of the commission of the transportation district.

§ 8.01-195.5

Settlement of certain cases

The Attorney General shall have authority in accordance with §2.1-127 to compromise and settle claims against the Commonwealth cognizable under this article.

The chairman of the commission for a transportation district against which a claim was filed pursuant to this article, or such other person as may be designated by the commission, shall have the authority to compromise, settle and discharge the claim provided (i) the proposed settlement and reasons therefor are submitted to the commission in writing and approved by its members or (ii) the settlement is made in accordance with a written policy approved by the transportation district commission for such settlements. The Director of the Division of Risk Management may adjust, compromise and settle claims against the Commonwealth cognizable under this article prior to the commencement of suit unless otherwise directed by the Attorney General.

§ 8.01-195.6

Notice of claim

Every claim cognizable against the Commonwealth or a transportation district shall be forever barred unless the claimant or his agent, attorney or representative has filed a written statement of the nature of the claim, which includes the time and place at which the injury is alleged to have occurred and the agency or agencies alleged to be liable. The statement shall be filed with the Director of the Division of Risk Management or the Attorney General within one year after such cause of action accrued if the claim is against the Commonwealth. If the claim is against a transportation district the statement shall be filed with the chairman of the commission of the transportation district within one year after the cause of action accrued. However, if the claimant was under a disability at the time the cause of action accrued, the tolling provisions of §8.01-229 shall apply. The claimant or his agent, attorney or representative shall, in a claim cognizable against the Commonwealth, mail the notice of claim via the United States Postal Service by certified mail, return receipt requested, addressed to the Director of the Division of Risk Management or the Attorney General in Richmond. The notice, in a claim cognizable against a transportation district, shall be mailed via the United States Postal Service by certified mail, return receipt requested, addressed to the chairman of the commission of the transportation district.

In any action contesting the filing of the notice of claim, the burden of proof shall be on the claimant to establish mailing and receipt of the notice in conformity with this section. The signed return receipt indicating delivery to the Director of the Division of Risk Management, the Attorney General, or the chairman of the commission of the transportation district, when admitted into evidence, shall be prima facie evidence of filing of the notice under this section. The date on which the return receipt is signed by the Director, the Attorney General, or the chairman shall be prima facie evidence of the date of filing for purposes of compliance with this section.

Claims against the Commonwealth involving medical malpractice shall be subject to the provisions of this article and to the provisions of Chapter 21.1 (§8.01-581.1 et seq.) of this title. However, the recovery in such a claim involving medical malpractice shall not exceed the limits imposed by § 8.01-195.3.

§ 8.01-195.7

Statute of limitations

Every claim cognizable against the Commonwealth or a transportation district under this article shall be forever barred, unless within one year after the cause of action accrues to the claimant the notice of claim required by § 8.01-195.6 is properly filed. An action may be commenced pursuant to § 8.01-195.4 (i) upon denial of the claim by the Attorney General or the Director of the Division of Risk Management or, in the case of a transportation district, by the chairman of the commission of that district or (ii) after the expiration of six months from the date of filing the notice of claim unless, within that period, the claim has been compromised and discharged pursuant to §8.01-195.5. All claims against the Commonwealth or a transportation district under this article shall be forever barred unless such action is commenced within eighteen months of the filing of the notice of claim.

The limitations periods prescribed by this section and §8.01-195.6 shall be subject to the tolling provision of §8.01-229 and the pleading provision of §8.01-235. Additionally, claims involving medical malpractice in which the notice required by this section and §8.01-195.6 has been given shall be subject to the provisions of §8.01-581.9. Notwithstanding the provisions of this section, if notice of claim against the Commonwealth was filed prior to July 1, 1984, any claimant so filing shall have two years from the date such notice was filed within which to commence an action pursuant to

§ 8.01-195.8

Release of further claims

Notwithstanding any provision of this article, the liability for any claim or judgment cognizable under this article shall be conditioned upon the execution by the claimant of a release of all claims against the Commonwealth, its political subdivisions, agencies, and instrumentalities or against the transportation district, and against any officer or employee of the Commonwealth or the transportation district in connection with, or arising out of, the occurrence complained of.

§ 8.01-195.9

Claims evaluation program

The Division of Risk Management of the Department of General Services and the Attorney General shall develop cooperatively an actuarially sound program for identifying, evaluating and setting reserves for the payment of claims cognizable under this article.

Appendix XVI:
Recreational Use Statute

§ 29.1-509

Duty of care and liability for damages of landowners to hunters, fishermen, sightseers, etc

A. For the purpose of this section:

"Fee" means any payment or payments of money to a landowner for use of the premises or in order to engage in any activity described in subsections B and C of this section, but does not include rentals or similar fees received by a landowner from governmental sources or payments received by a landowner from incidental sales of forest products to an individual for his personal use, or any action taken by another to improve the land or access to the land for the purposes set forth in subsections B and C of this section or remedying damage caused by such uses.

"Land" or "premises" means real property, whether rural or urban, waters, boats, private ways, natural growth, trees and any building or structure which might be located on such real property, waters, boats, private ways and natural growth.

"Landowner" means the legal title holder, lessee, occupant or any other person in control of land or premises.

B. A landowner shall owe no duty of care to keep land or premises safe for entry or use by others for hunting, fishing, trapping, camping, participation in water sports, boating, hiking, rock climbing, sightseeing, hang gliding, skydiving, horseback riding, foxhunting, racing, bicycle riding or collecting, gathering, cutting or removing firewood, for any other recreational use, or for use of an easement granted to the Commonwealth or any agency thereof to permit public passage across such land for access to a public park, historic site, or other public recreational area. No landowner shall be required to give any warning of hazardous conditions or uses of, structures on, or activities on such land or premises to any person entering on the land or premises for such purposes, except as provided in subsection D.

C. Any landowner who gives permission, express or implied, to another person to hunt, fish, launch and retrieve boats, swim, ride, foxhunt, trap, camp, hike, rock climb, hang glide, skydive, sightsee, engage in races, to collect, gather, cut or remove forest products upon land or premises for the personal use of such person, or for the use of an easement as set forth in subsection B does not thereby:

1. Impliedly or expressly represent that the premises are safe for such purposes; or

2. Constitute the person to whom such permission has been granted an invitee to whom a duty of care is owed; or

3. Assume responsibility for or incur liability for any intentional or negligent acts of such person or any other person, except as provided in subsection D.

D. Nothing contained in this section, except as provided in subsection E, shall limit the liability of a landowner which may otherwise arise or exist by reason of his gross negligence or willful or malicious failure to guard or warn against a dangerous condition, use, structure, or activity. The provisions of this section shall not limit the liability of a landowner which may otherwise arise or exist when the landowner receives a fee for use of the premises or to engage in any activity described in subsections B and C of this section. Nothing contained in this section shall relieve any sponsor or operator of any sporting event or competition including but not limited to a race or triathlon of the duty to exercise ordinary care in such events.

E. For purposes of this section, whenever any person enters into an agreement with, or grants an easement to, the Commonwealth or any agency thereof, any county, city, or town, or with any local or regional authority created by law for public park, historic site or recreational purposes, concerning the use of, or access over, his land by the public for any of the purposes enumerated in subsections B and C of this section, the government, agency, county, city, town, or authority with which the

agreement is made shall hold a person harmless from all liability and be responsible for providing, or for paying the cost of, all reasonable legal services required by any person entitled to the benefit of this section as the result of a claim or suit attempting to impose liability. Any action against the Commonwealth, or any agency, thereof, for negligence arising out of a use of land covered by this section shall be subject to the provisions of the Virginia Tort Claims Act (§8.01-195.1 et seq.). Any provisions in a lease or other agreement which purports to waive the benefits of this section shall be invalid, and any action against any county, city, town, or local or regional authority shall be subject to the provisions of §15.2-1809, where applicable.

Go to (previous section) or (next section) or (General Assembly Home)

Appendix XVII:
Rules of the Trail &
Trail Etiquette Samples

I·M·B·A

INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION

Rules of the Trail

Thousands of miles of dirt trails have been closed to mountain bicyclists. The irresponsible riding habits of a few riders have been a factor. Do your part to maintain trail access by observing the following rules of the trail, formulated by the International Mountain Bicycling Association (IMBA). IMBA's mission is to promote environmentally sound and socially responsible mountain biking.

1. Ride on open trails only.

Respect trail and road closures (ask if not sure), avoid possible trespass on private land, obtain permits and authorization as may be required. Federal and state wilderness areas are closed to cycling. The way you ride will influence trail management decisions and policies.

2. Leave no trace.

Be sensitive to the dirt beneath you. Even on open (legal) trails, you should not ride under conditions where you will leave evidence of your passing, such as on certain soils after a rain. Recognize different types of soils and trail construction; practice low-impact cycling. This also means staying on existing trails and not creating any new ones. Be sure to pack out at least as much as you pack in.

3. Control your bicycle.

Inattention for even a second can cause problems. Obey all bicycle speed regulations and recommendations.

4. Always yield trail.

Make known your approach well in advance. A friendly greeting (or bell) is considerate and works well; don't startle others. Show your respect when passing by slowing to a walking pace or even stopping. Anticipate other trail users around corners or in blind spots.

5. Don't scare animals.

All animals are startled by an unannounced approach, a sudden movement, or a loud noise. This can be dangerous for you, others, and the animals. Give animals extra room and time to adjust to you. When passing horses use special care and follow directions from the hroseback riders (ask if uncertain). Running cattle and distrubing wildlife is a serious offense. Leave gates as you found them, or as marked.

6. Plan ahead.

Know your equipment, your ability, and the area in which you are riding -- and prepare accordingly. Be self-sufficient at all times, keep your equipment in good repair, and carry necessary supplies for changes in weather or other conditions. A well-executed trip is a satisfaction to you and not a burden or offense to others. Always wear a helmet.

PO Box 7578, Boulder, CO 80306 • (303) 545-9011 • FAX (303) 545-9026

How To Prevent Trail Closures

An Education Paper
International Mountain Bicycling Association (IMBA)
P.O. Box 7578, Boulder, CO 80306-7578
(303)545-9011 (303)545-9026 Fax

Prevention is Best

Diffuse the build-up of pressures over potential closures before the crisis stage is reached. Face the issue squarely and plan appropriate early response.

1. Start weekend patrols to warn irresponsible riders that they are hurting everyone.
2. Start a safe and responsible mountain bike riding program (with shops, clubs, or schools).
3. Have local bicycle dealers distribute IMBA's "Rules of the Trail" and explain to their customers why trail etiquette matters.
4. Get involved with land and trail management.
5. Develop a long-term reputation for caring about the environment.
6. Foster the idea that dirt trails are not necessarily a public right of way for bikes; riding on dirt is a privilege.
7. Learn who controls the dirt access where you ride, and volunteer with groups to do trail maintenance.

Respect Other Trail Users

1. Show a maximum of trail courtesy and respect to all trail users. We're all members of the trail family enjoying the quiet and natural beauty of the backcountry. We must learn to share.
2. Take the time to set a good example. Stop, dismount, and talk with other trail users. Our motivations are no different than those of other users regardless of mode of travel.
3. Show concern for a clean, quiet backcountry experience. Keep trails as natural as possible.
4. Show that you understand other trail user's fears, needs, and desires.

Organize!!

1. Get a group together to further your interests and establish regular meeting times and places.
2. Develop a consensus on appropriate places to ride area and what is best for all concerned.
3. Communicate your concerns to other user groups and land managers. Learn about and use the political process.
4. Develop appropriate education/training programs to increase public awareness and support.
5. Adopt a trail and do other volunteer work.
6. Support IMBA and other conservation organizations. Find out what is working in other areas to provide or continue land access.
7. Don't become discouraged or bitter; democracy is sometimes slow, but persistence and a cooperative attitude will eventually pay off.
8. Develop ways to share and maintain scarce resources. Show you care by actions as well as words.

In Case of Imminent Crisis . . .

1. Identify decision makers who will decide the outcome of the issue. Find out where and when public hearings will be. Develop a plan and work with it. Take action!!
2. Establish criteria for decisions:
    a. If public safety is the problem, push for educational barricades and safety patrols.
    b. If user input is wanted, do an analysis of trail users.
    c. If affected voters must be mobilized, circulate a petition and begin a letter-writing campaign.
    d. If there is a broad base of trail users, form a coalition with other user-groups who help in trail maintenance. Volunteer together for projects.
3. Ask decision makers if you and others can present oral and written testimony. If necessary, ask for a delay in hearings to gain time to take the actions above.
4. Mobilize your groups or organization. Hold meetings, attend hearings, provide information, etc.
5. Get those with an economic interest to back you: bike shops, resorts, tourist groups, newspapers, local businesses, etc. Let IMBA and other groups know what is happening.
6. Show respect and develop a responsible reputation. Learn from the process so that if you don't get what you want the first time, you will be better prepared in the future.

For additional copies of this paper, please contact IMBA at the above address or telephone number.

Appendix XVIII:
Trail Grade
Calculation Details

Trail Grade Calculation

[Much of this was taken from SCA's Lightly on the Land, 1996, pp. 110-112]

Percent of grade=rise/run

1. On the topographic map (lower margin) locate the contour interval denoting the vertical distance between the contour lines. Insert that number in the equation as the *rise*.

2. Select a potential percent of grade that does not exceed the maximum allowed in the specifications for the proposed trail. Insert that number in the equation as the *percent of grade*.

3. Solve for run by dividing rise by percent of grade

4. In the map margin, find the bar scale that is divided into feet. Use it as a reference to spread the divider points to the length of the run in your equation.

5. Set one point of the dividers on the map contour line where the trail will begin. Swing the dividers around in the direction that the trail will likely head, and rest the other point on the next higher or lower contour line. The gap between the points of the dividers represents on the map the approximate location of a route climbing or descending at your selected percent of grade.\

6. Walk the dividers from the trailhead to the first control point, climbing or descending by always placing the free point of the dividers on the appropriate adjacent contour line. If the dividers come close to the first control point marked on your map, you will know that the percent of grade you have chosen is the reading to use when you begin the actual surveying in the field. If the dividers pass well above or below the first control point, you will need to try different percents of grade until you plot the best one for your trail.

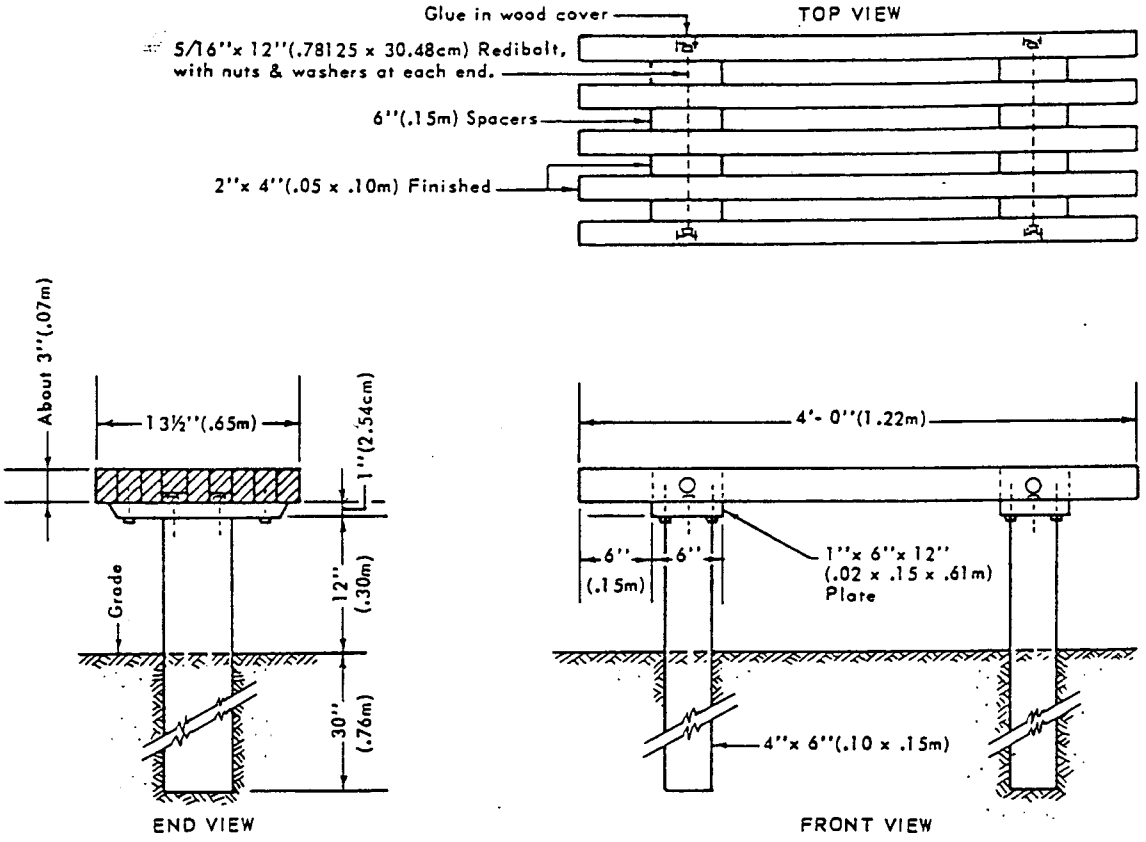
7. Pencil in the workable route at the appropriate percent of grade on the map. Continue testing grades with dividers to connect the control points, until you plot the entire trail. The grade may vary between points.

8. When the terrain is step, you may not be able to plot a line that reaches a control point even at the highest percent of grade allowed. Explore other options such as contouring the trail around the head of a valley or behind a hillside, or even plotting a switchback. Make the trail segments leading to and from the switchback as long as possible to lessen the number of turns needed.

EX. At an 8 percent grade, a trail will rise a total of 8 feet in elevation for every 100 feet of run. If the interval between a map's contour lines is 40 feet, an 8 percent trail must have a run of 500 feet (40 = .08 X 500) to rise from one contour line to another.

Appendix XIX.

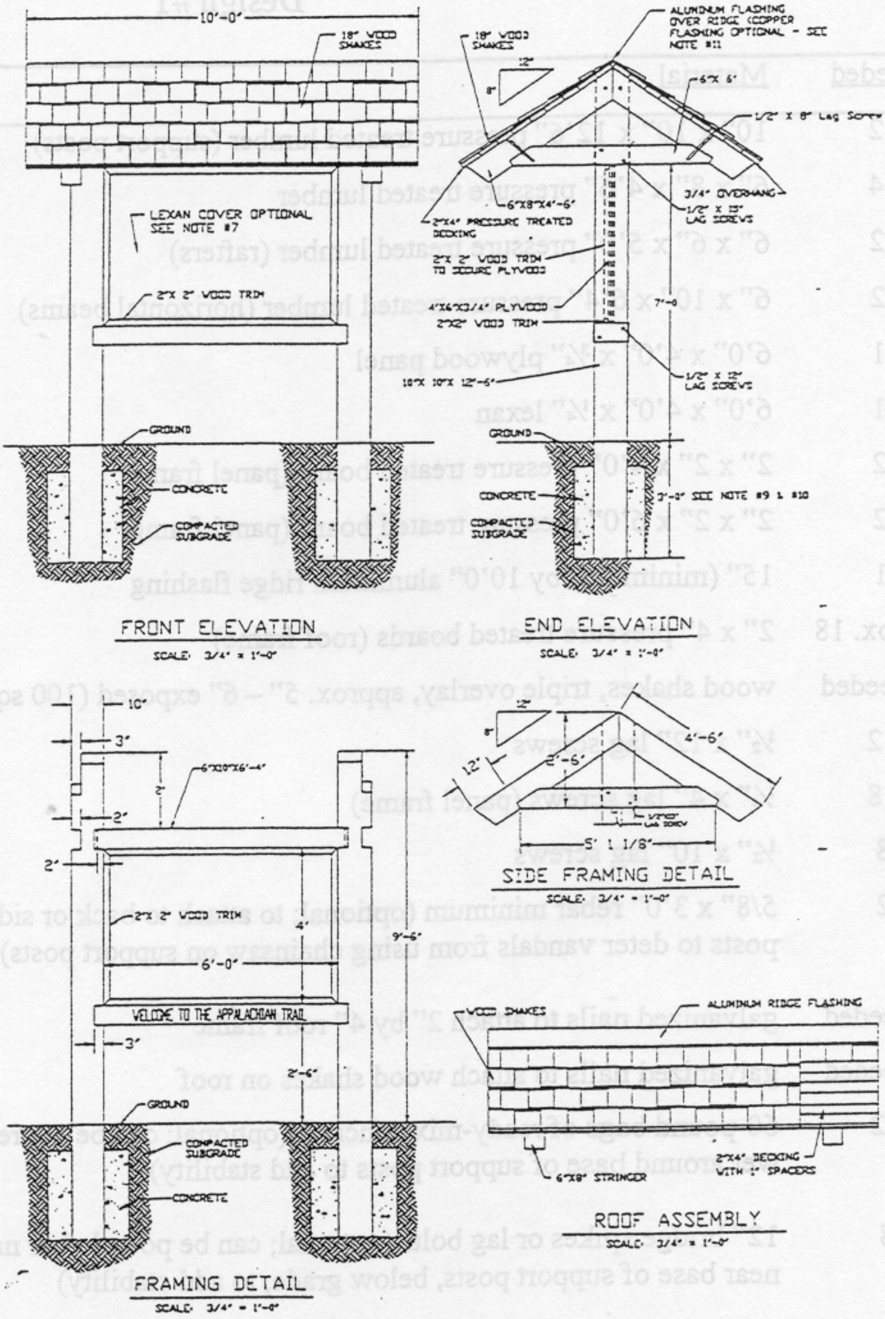
Sample Bench Design


Glue in wood cover
TOP VIEW
5/16"x 12"(.78125 x 30.48cm) Redibolt, with nuts & washers at each end.
6"(.15m) Spacers
2"x 4"(.05 x .10m) Finished
About 3"(.07m)
13½"(.65m)
1"(2.54cm)
Grade
12" (.30m)
30" (.76m)
END VIEW
4'- 0"(1.22m)
6"
6"
(.15m)
1"x 6"x 12" (.02 x .15 x .61m) Plate
4"x 6"(.10 x .15m)
FRONT VIEW

Appendix XX:
Sample Kiosk Design

RECOMMENDED BY:
APPALACHIAN TRAIL CONFERENCE
NPS APPALACHIAN TRAIL PROJECT OFFICE

DESIGN #1
LONG LASTING
BULLETIN BOARD



NOTES:

(NOT TO SCALE)

1. ALL WOOD SHOULD BE PRESSURE TREATED.
2. ALL HARDWARE AND NAILS SHALL BE GALVANIZED
3. CEDAR WOOD SHAKES SHOULD BE APPROXIMATELY 18" X 1/2" HANDSPLIT WITH A 5 1/2" EXPOSURE.
4. FINISH SHOULD BE NATURAL.
5. STANDARD SLAT SIGN SHOULD HAVE APPROXIMATELY 2" LETTERS - "WELCOME TO THE APPALACHIAN TRAIL". WOOD ROUTED OR WHITE REFLECTIVE PAINT.
6. EASE ALL EXPOSED EDGES.
7. LEXAN COVER FOR PLYWOOD IS OPTIONAL. ATTACH 2" X 2" WOOD TRIM TO OUTSIDE EDGE O LEXANWITH 1/4" LAG SCREWS. ATTACH LEXAN TO PANEL AT TOP WITH 3" X 3" HINGES (OR COMPARABLE SIZE DOOR HINGES).
8. OPTIONAL: 5/8" REBAR MAY BE ATTACHED TO BACK OF 10"X10" SUPPORT POSTS TO DETER VANDALS.
9. IN NORTHERN LOCATIONS, SINK SUPPORT POSTS TO A MINIMUM DEPTH OF 4'.
10. IF CONCRETE WILL NOT BE USED AROUND SUPPORT POSTS (FOOTERS), INCREASE DEPTH AN ADDITIONAL 1'0".
11. OPTIONAL: USE COPPER FLASHING EXPOSED 1" ON EITHER SIDE FROM UNDER SHAKE CAP. (COPPER WASH ON ROOF HELPS PREVENT MOLD AND MILDEW)

Appalachian Trail Gateway Bulletin Board

Materials List
Long-Lasting Bulletin Board
Design #1

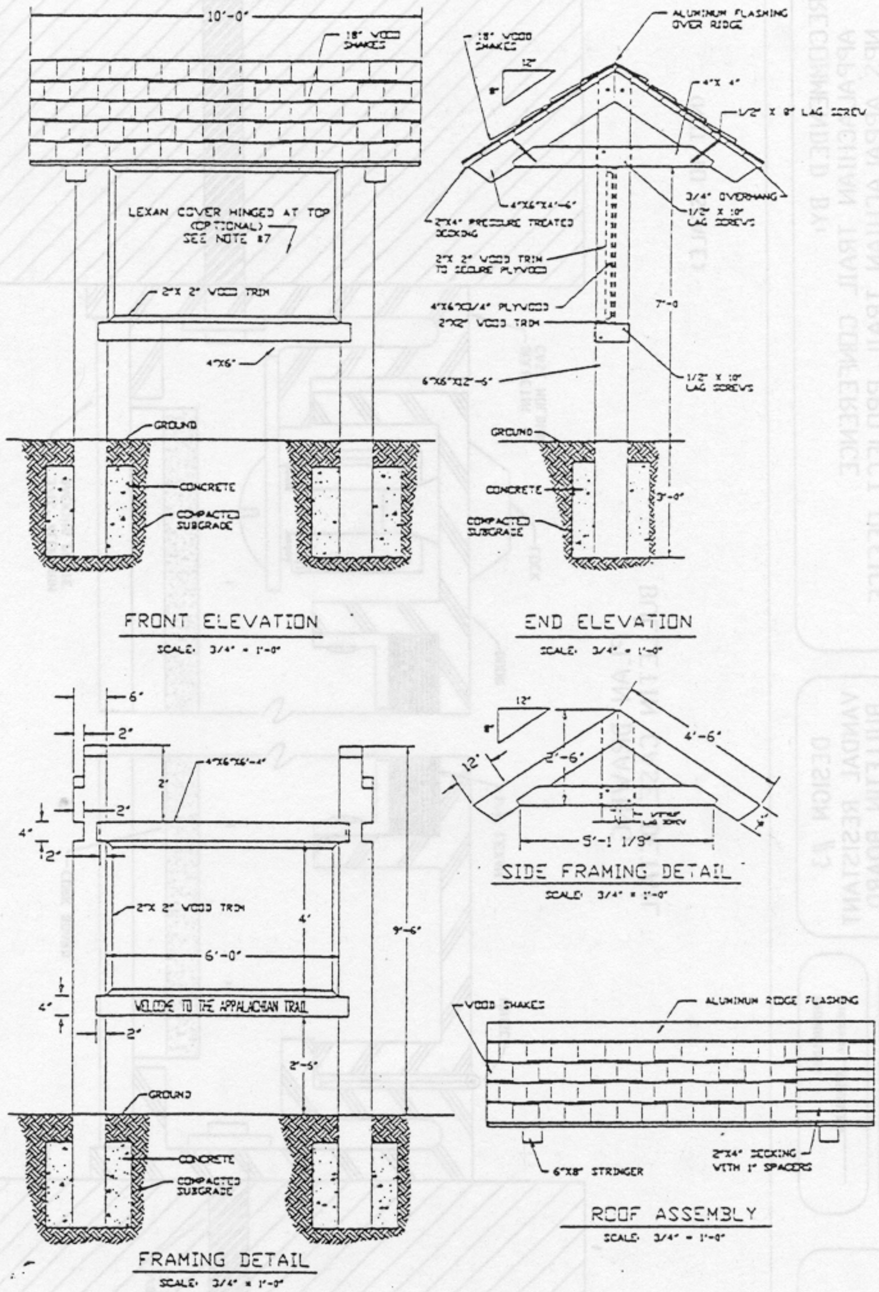
# Needed	Material	Approximate Cost
2	10" x 10" x 12'6" pressure treated lumber (support posts)	$260.00
4	6" x 8" x 4'6" pressure treated lumber	$100.00
2	6" x 6" x 5'0" pressure treated lumber (rafters)	$40.00
2	6" x 10" x 6'4" pressure treated lumber (horizontal beams)	$100.00
1	6'0" x 4'0" x ¾" plywood panel	$20.00
1	6'0" x 4'0" x ¼" lexan	$160.00
2	2" x 2" x 4'0" pressure treated board (panel frame)	$5.00
2	2" x 2" x 6'0" pressure treated board (panel frame)	$5.00
	15" (minimum) by 10'0" aluminum ridge flashing	$10.00
approx. 18	2" x 4" pressure treated boards (roof frame)	$50.00
as needed	wood shakes, triple overlay, approx. 5" – 6" exposed (100 sq. ft.)	$150.00
12	½" x 12" lag screws	$25.00
18	¼" x 4" lag screws (panel frame)	$5.00
8	½" x 10" lag screws	$15.00
2	5/8" x 3'0" rebar minimum (optional; to attach to back or side of posts to deter vandals from using chainsaw on support posts)	$5.00
as needed	galvanized nails to attach 2" by 4" roof frame	$5.00
as needed	galvanized nails to attach wood shakes on roof	$5.00
12	60-pound bags of ready-mix concrete (optional; can be poured dry or wet around base of support posts to add stability)	$35.00
8	12" bridge spikes or lag bolts (optional; can be pounded or nailed near base of support posts, below grade, to add stability)	$5.00
	Total Cost:	$1000.00

note: costs are estimates only; prices may vary significantly by locale

note: larger-dimension lumber may have to be special-ordered from a sawmill

RECOMMENDED BY:
APPALACHIAN TRAIL CONFERENCE
NPS APPALACHIAN TRAIL PROJECT OFFICE

DESIGN #2
ECONOMIC
BULLETIN BOARD



(NOT TO SCALE)

NOTES:

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3. CEDAR WOOD SHAKES SHOULD BE APPROXIMATELY 18" X 1/2" HANDSPLIT WITH A 5 1/2" EXPOSURE.
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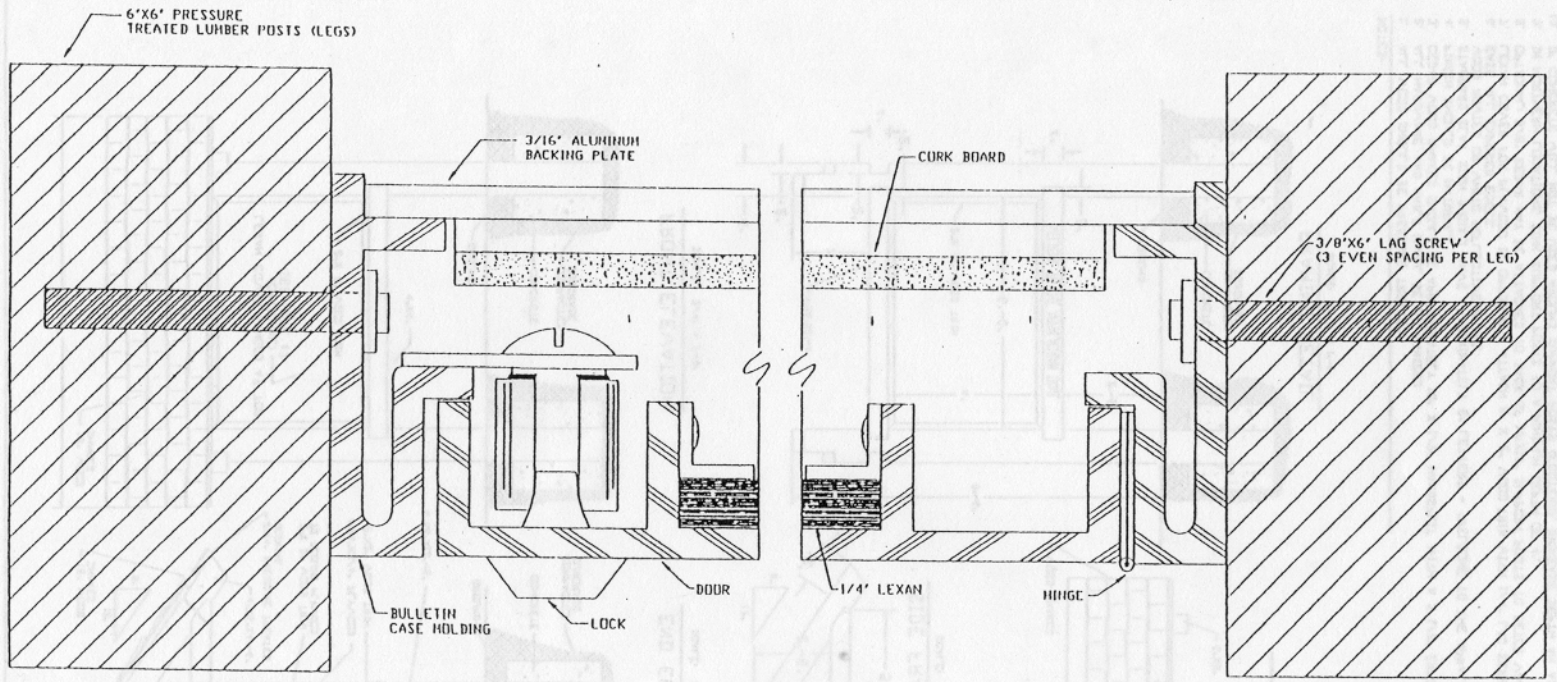
Appalachian Trail Gateway Bulletin Board

Appalachian Trail Gateway Bulletin Board



PLAN DRAWING
BULLETIN CASE DETAIL

(NOT TO SCALE)

RECOMMENDED BY:
APPALACHIAN TRAIL CONFERENCE
NPS APPALACHIAN TRAIL PROJECT OFFICE

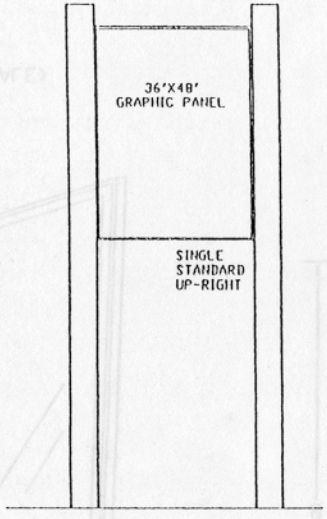
DESIGN #3
VANDAL RESISTANT
BULLETIN BOARD

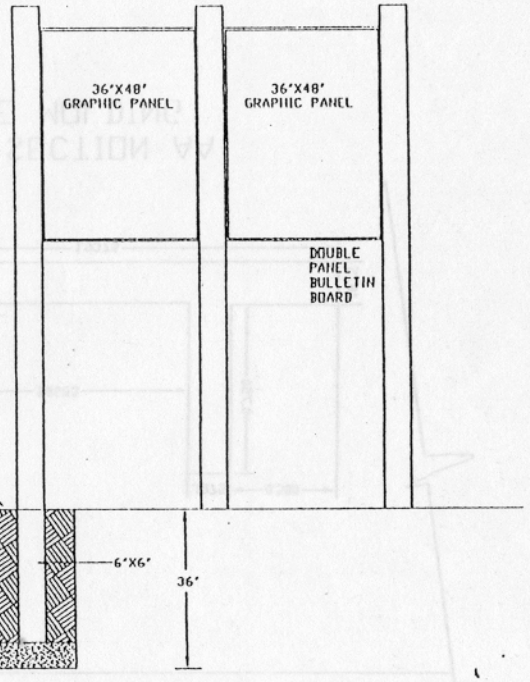
PRODUCTION
DESIGNED BY: HOPEWELL N.G.

PAGE 3 OF 3

MODIFIED BY: V. WILLIAMS
DRAFTED BY: C. BRAUER
CHECKED BY: V. WILLIAMS & BVTM
FILE NAME/DATE: MAILBT 8/22/95

Appalachian Trail Gateway Bulletin Board





(NOT TO SCALE)

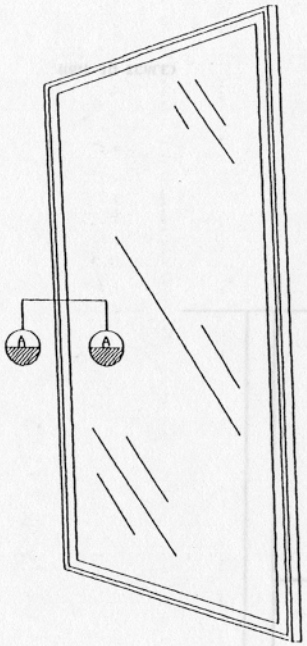
RECOMMENDED BY:
APPALACHIAN TRAIL CONFERENCE
NPS APPALACHIAN TRAIL PROJECT OFFICE

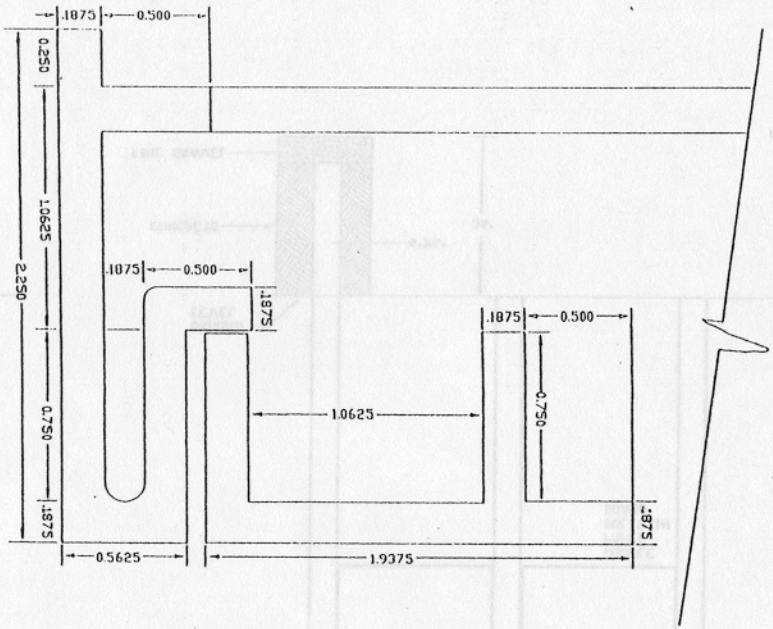
DESIGN #3
VANDAL RESISTANT
BULLETIN BOARD

PRODUCTION
DESIGNED BY: HOPEWELL MFG

PAGE 1 OF 3

MODIFIED BY: V. WILLIAMS
DRAWN BY: C. MANN
CHECKED BY: V. WILLIAMS & C. MANN
FILE NUMBERS: BULLETIN 2/27/97





PLAN-SECTION AA
CASE MOLDING

(NOT TO SCALE)

Appalachian Trail Gateway Bulletin Board

RECOMMENDED BY:
APPALACHIAN TRAIL CONFERENCE
NPS APPALACHIAN TRAIL PROJECT OFFICE

DESIGN #3
VANDAL RESISTANT
BULLETIN BOARD

PRODUCTION
DESIGNED BY: HOPEWELL NG

MODIFIED BY: V. VALIUNAS
DRAFTED BY: C. RAWLES
CHECKED BY: V. VALIUNAS & D/GS
FILE NAME/DATE: BASIS 2/11/93

Materials List
Vandal-Resistant Bulletin Board
Design #3

Single Upright Panel Bulletin Board

# Needed	Material	Approximate Cost
1	36" x 48" single standard upright panel bulletin board	$800.00
12	60-pound bags of ready-mix concrete	$35.00
	Total Cost:	$835.00

or:

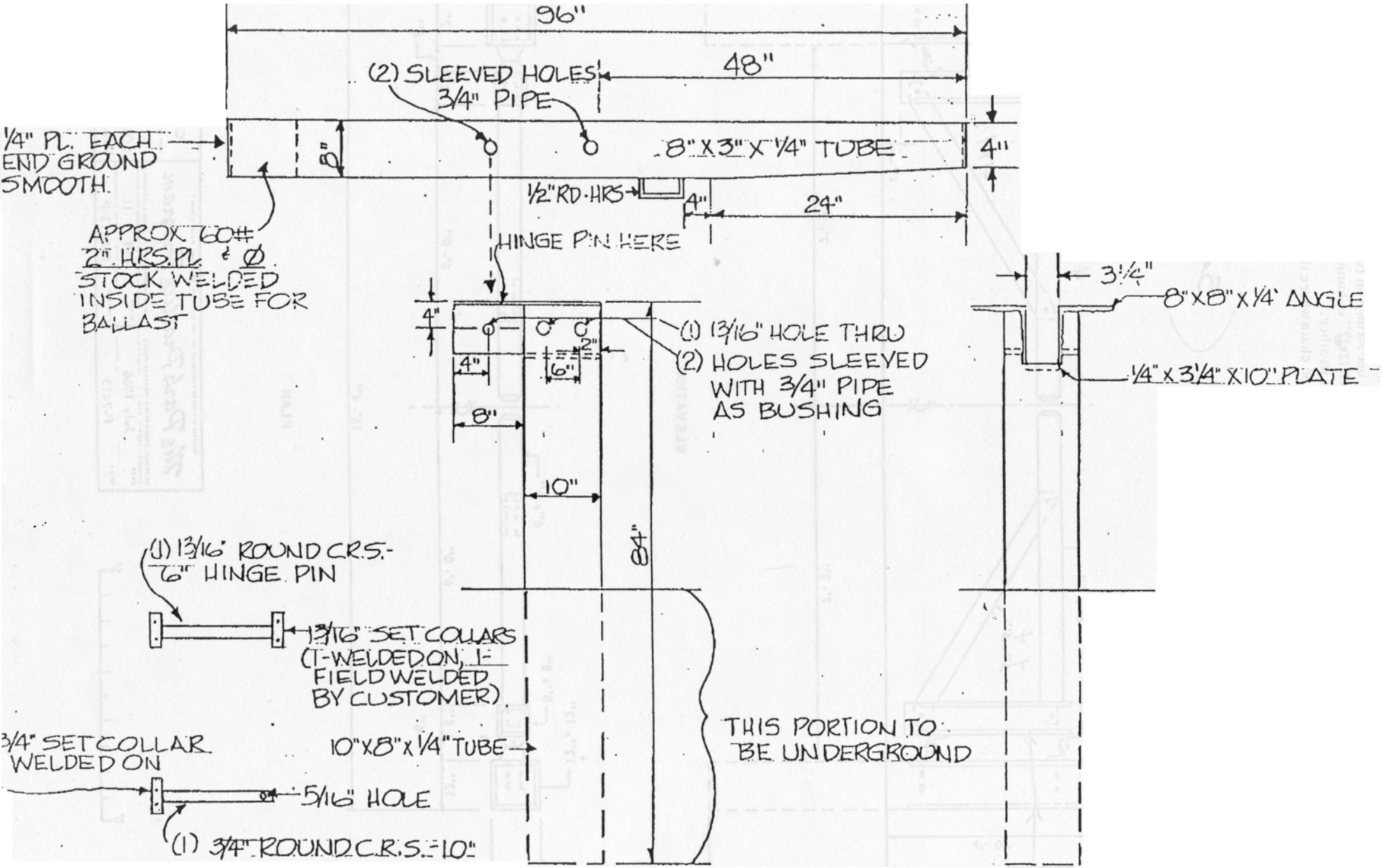
Double Upright Panel Bulletin Board

# Needed	Material	Approximate Cost
1	36" x 48" double upright panel bulletin board	$1000.00
18	60-pound bags of ready-mix concrete	$50.00
	Total Cost:	$1050.00

note: costs based on special-order through ATC; arrangements should be made through the regional office for your area.

Appendix XXI:
Sample Gate Design

PARK GATE FC.
NEW RIVER TRAIL S.P.



- ALL JOINTS WELDED SOLID
- ALL EDGES DE-BURRED
- PIVOT & LOCKING PIN WITH PIPE BUSHING FOR SMOOTH OPER.

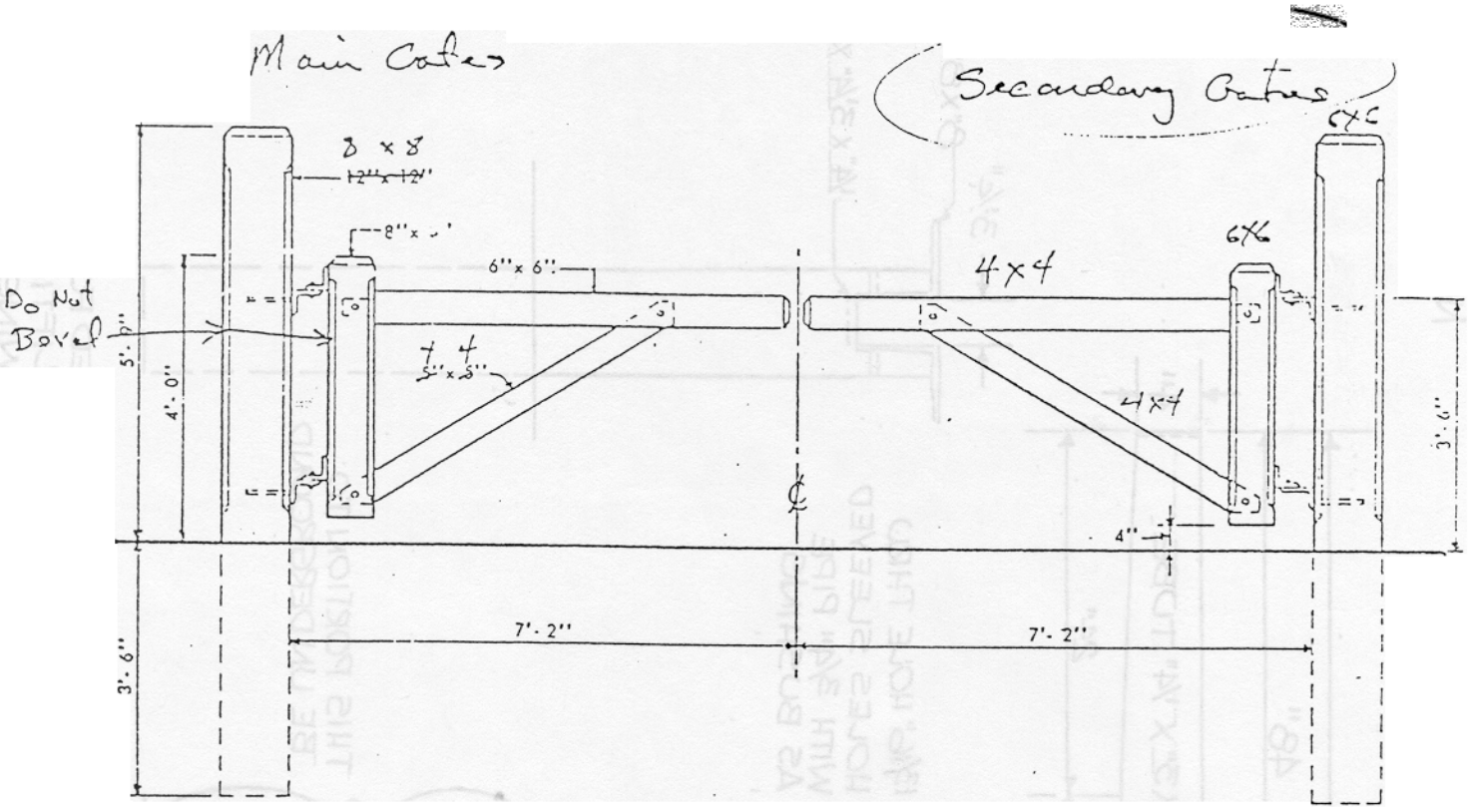
- END OF ARM BALLASTED FOR BALANCE & EASE OF LIFTING, BUT NOT RAPID UPSWING.

NOT TO SCALE

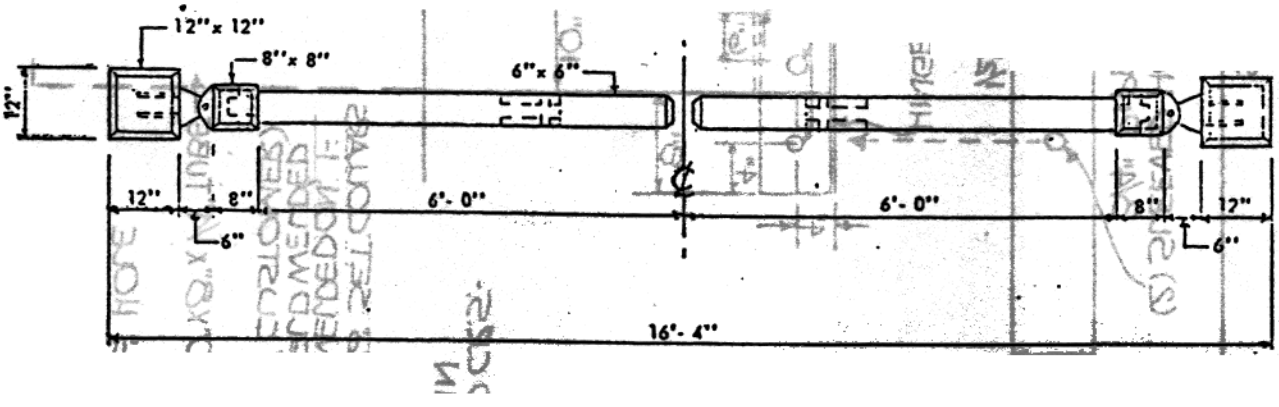
Here is an "old stand-by" type of gate—neat in appearance and thoroughly practical—but with a new twist. Instead of the rail post pivoting on a base pin, this one swings on two in-line brackets hung on each 12x12" columns.

Should move freely in all weather.

Locking may be by hasp or chain where the rails meet.



ELEVATION



PLAN

The Park Practice Program	CAMP ENTRANCE GATE
July 1966	Contributed by SOIL CONSERVATION SERV.
P-2413	499 11 F-0913-P U.S. Department of Agriculture

0' 5'

Appendix XXII:
Green Pages

Information and Technical Assistance

Accokeek Foundation
3400 Bryan Point Road
Accokeek, MD 20607
Tel (301) 283-2113
Fax (301) 283-2049

Advisory Council on Historic Preservation
1100 Pennsylvania Ave., NW, # 809
Washington, DC 20240
Tel (202) 786-0503

American Farmland Trust
1920 N. Street, NW $400
Washington, D.C. 20036
Tel (202) 659-5170

American Hiking Society
Silver Spring, MD
Tel (301) 565-6704
URL http://www.americanhiking.org

Appalachian Trail Conference
P.O. Box 807
Harpers Ferry, WV 25425-0807
Tel (304) 535-6331
Fax (304) 535-2667

US Army Corps of Engineers
Baltimore District Office
P.O. Box 1715
Baltimore, MD 21203
Tel (410) 962-2809
Fax (410) 962-3660
URL http://www.nab.usace.army.mil

US Army Corps of Engineers
Huntington District
Attn: OR-FS
502 8th Street
Huntington, WV 25701
Tel (304) 529-5710
Fax (304) 529-5085

US Army Corps of Engineers
Norfolk District
Attn: Regulatory Branch
803 Front Street
Norfolk, VA 23510
Tel (757) 441-7652
Fax (757) 441-7678

US Army Corps of Engineers
Wilmington District
69 Darlington Avenue
P. O. Box 1890
Wilmington, NC 28402
Tel (910) 251-4626
Fax (910) 251-4946

Association for the Preservation of Civil War Sites
11 Public Square, Suite 200
Hagerstown, MD 21740
Tel (301) 665-1400
Fax (301) 665-1416
URL www.apcws.com

Burwell-van Lennep Foundation
P.O. Box 245
Millwood, VA 22646
Tel (540) 837-1353
Fax (540) 837-1352

CBF - Tappahannock Office
Va. Cons. Lands Program
P. O. Box 220
Tappahannock, VA 22560
Tel (804) 443-5629
Fax (804) 443-1993

Chesapeake Bay Local Assistance Department
701 Eighth Street Office Building
Richmond, VA 23219
Tel (804) 225-3440
Fax (804) 225-3447

Chesapeake Bay Foundation
1001 E. Main Street, Suite 710
Richmond, VA 23219
Tel (804) 780-1392
Fax (804) 648-4011
URL www.savethebay.org

Citizens for a Better Eastern Shore
P. O. Box 882
Eastville, VA 23347

Civil War Trust
2101 Wilson Boulevard, Suite 1120
Arlington, VA 22201
Tel (703) 516-4944
Fax (703) 516-4947
URL www.civilwar.org

Conservation Fund, The
1800 North Kent St., Suite 1120
Arlington, VA 22209-2156
Tel (703) 525-6300
Fax (703) 525-4610

Conservation, Inc.
550 East Main Street, Suite 508
Norfolk, VA 23510
Tel (757) 623-0777
Fax (757) 623-2785

Fairfax Land Preservation Trust
Packard Center
4022 Hummer Drive
Annandale, VA 22003
Tel (703) 354-5093

Friends of Chesterfield's Riverfront
P.O. Box 2158
Chesterfield, VA 23832
Tel (804) 796-6091
Fax (804) 796-6092
E-mail riverfront@earthlink.net

Friends of Dragon Run
P. O. Box 882
Gloucester, VA 23061
Tel (804) 642-2283

Institute of Conservation Leadership
2000 P St., NW, Suite 412
Washington, DC 20036
Tel (202) 466-3330

K-III Directory Corp.
1735 Technology Dr., Suite 410
San Jose, CA 95110
Tel (800) 547-8753 x 6783
Fax (408) 467-6789

James River Association
P.O. Box 110
Richmond, VA 23201
Tel (804) 730-2898
Fax (804) 730-8297

Land Trust Alliance
1319 F St., NW
Washington, DC 20004-1106
Tel (202) 638-4725

Land Trust of Virginia
7 East Market St., Suite 210
Leesburg, VA 22176
Tel (703) 771-1474

League of American Bicyclists (LAB)
190 W Ostend St.
Baltimore, MD 21130-3755
Tel (410) 539-3399
Fax (410) 539-3496
Email bikeleague@aol.com
URL http://www.bikeleague.org

Mathews County Land Conservancy
HCR 69, Box 17280
Mathews, VA 23109
Tel (804) 725-9685
Fax (804) 725-9111

National Center for Nonprofit Boards
2000 L St., NW, Suite 510
Washington, DC 20036-4790
Tel (202) 452-6262
Fax (202) 452-6299
Email ncnb@ncnb.org

National Bicycle and Pedestrian Clearinghouse
1506 21st Street, NW
Suite 210
Washington, DC 20036
Tel (800) 760-NBPC
(202) 463-8405
Fax (202) 463-6625

National Coalition for the New River
P. O. Box 1107
Jefferson, NC 28640
Tel (910) 982-9090
Fax same

National Park Service
Rivers, Trails and Conservation Assistance Program
US Custom House
200 Chestnut St., Third Floor
Philadelphia, PA 19106
Tel (215) 597-7995
Fax (215) 597-0932

National Register of Historic Places
National Park Service, Mid-Atlantic Regional Office
143 South Third St.
Philadelphia, PA 19106
Tel (215) 597-1581
Fax (215) 597-0932

National Transportation Enhancement Clearinghouse
1506 Twenty-first St., NW, Suite 210
Washington, DC 20036
Tel (888) 388-6832
Fax (202) 463-0875
Email ntec@transact.org
URL http://www.transact.org/ntec.htm

National Trust for Historic Preservation
1785 Massachusetts Ave., NW
Washington, DC 20036
Tel (202) 673-4000

The Nature Conservancy
1233A Cedars Court
Charlottesville, VA 22903
Tel (804) 295-6106
Fax (804) 979-0370

Non-Profit Management Development Center
La Salle University
1900 W. Olney Ave.
Philadelphia, PA 19141-1199
Tel (215) 951-1701
Fax (215) 951-1488

Northern Neck Audubon Society
P. O. Box 991
Kilmarnock, Va 22482

Pennsylvania Greenways Partnership
Pennsylvania Environmental Council
600 North 2nd St., Suite 403
Harrisburg, PA 17101
Tel (717) 230-8044
Fax (717) 230-8045
Email pec-hbg@ix.netcom.com
URL http://www.libertynet.org/pecphila

Piedmont Environmental Council
P. O. Box 460
Warrenton, Va 22186
Tel (540) 347-2334
Fax (540) 349-9003

Piedmont Environmental Council
Charlottesville Office
1111 Rose Hill Drive, Suite 1
Charlottesville, VA 22903

Potomac Appalachian Trail Club
118 Park Street, SE
Vienna, VA 22180
Tel (703) 242-0693
Fax (703) 242-0968

Potomac Conservancy
4022 Hummer Road
Annandale, VA 22003
Tel (703) 642-9880
Fax (703) 642-9881

Rails-to-Trails Conservancy
1100 Seventeenth St., NW, 10th Floor
Washington, DC 20036
Tel (202) 331-9696
Fax (202) 331-9680
URL http://www.railtrails.org

Rivanna Conservation Society
P.O. Box 141
Palmyra, VA 22963
Tel (804) 589-7576

Roanoke Valley Greenways
P.O. Box 29800
Roanoke, VA 24018
Tel (540) 776-7159
Fax (540) 772-2108
URL http://www.greenways.org

Scenic America
801 Pennsylvania Ave., SE, Suite 300
Washington, DC 20003
Tel (202) 543-6200

Surface Transportation Board (STB)
1201 Constitution Ave., NW
Washington, DC 20423
Tel (202) 927-6184

Transportation Enhancement Clearinghouse
1100 17th Street, NW
10th Floor
Washington, DC 20036
Tel (888) 388-6832
(202) 463-0641
Fax (202) 463-0875

Trust for Appalachian Trail Lands
Appalachian Trail Conference
P.O. Box 807
Harpers Ferry, WV 25425
Tel (304) 535-6331
Fax (304) 535-2667
URL www.atconf.org

Trust for Public Land
666 Broadway
New York, NY 10012
Tel (212) 677-7171

Trust for Public Land
666 Pennsylvania Avenue, SE
Washington, DC 20003
Tel (202) 543-7552

Valley Conservation Council
P. O. Box 2335
Staunton, VA 24401
Tel (540) 886-3541
Fax (540) 885-7314

Virginia Association of Soil and Water Conservation Districts
7293 Hanover Green Drive
Mechanicsville, VA 23111
Tel (804) 559-0324

Virginia Bicycle Federation
Rob Swennes, President
P. O. Box 5621
Arlington, VA 22205
Tel (703) 532-6101
E-mail vabikefed@erols.com

Virginia Code Commission
General Assembly Building
910 Capital St.
Richmond, VA 23219
Tel (804) 786-3591
Fax (804) 692-0625

Virginia Department of Conservation and Recreation
203 Governor St., Suite 326
Richmond, VA 23219
Tel (804) 786-6140 for technical assistance
Tel (804) 786-3218 for grants assistance
Fax (804) 371-7899

Virginia Department of Forestry
Attn: Paul Revell
Urban and Community Forestry Coordinator
900 Natural Resource Drive
PO Box 3758
Charlottesville, VA 22903
Tel (804) 977-6555

Virginia Department of Game and Inland Fisheries
4010 W. Broad Street
PO Box 11104
Richmond, VA 23230
Tel (804) 367-1000
Fax (804) 367-9147

Virginia Department of Historic Resources
2801 Kensington Ave.
Richmond, VA 23221
Tel (804) 367-2391
Fax (804) 367-2323

Virginia Department of Housing
and Community Development
Virginia Main Street Program
The Jackson Center
501 North 2nd Street
Richmond, VA 23219-1321
Tel (804) 371-7030

Virginia Department of Transportation
Enhancement Program Office
Robert Casada, Director
1401 E. Broad St.
Richmond, VA 23219
Tel (804) 786-2921
Fax: (804) 371-8719
E-mail casada_ro@vdot.state.va.us

Virginia Department of Transportation
Traffic Planning Division
Bicycle Planning Office
Attn: Susan Simmers
1401 E. Broad St.
Richmond, VA 23219
Tel (804) 371-4869
Fax (804) 225-4785
E-mail vabiking@vdot.state.va.us

Virginia Horse Council
P. O. Box 72
Riner, VA 24149
Tel (540) 382-3071
Fax (540) 382-3071

Virginia Outdoors Foundation
Attn: Tamara Vance, Executive Director
203 Governor's Street, #420
Richmond, VA 23219
Tel (804) 225-2147
Fax (804) 371-4810

Virginia Outdoors Foundation
Northern Virginia Office
P.O. Box 322
Aldie, VA 20105
Tel (703) 327-6118
Fax (703) 327-6444

Virginia Outdoors Foundation
Charlottesville Office
1010 Harris Street, #4
Charlottesville, VA 22903
Tel (804) 293-3423
Fax (804) 293-3859

Virginia Registrar of Regulations
General Assembly Building
901 Capitol Street
Richmond, VA 23219
Tel (804) 786-3591

Virginia Trails Association
P.O. Box 1132
Ashland, VA 23005
Tel (804) 798-4160
Fax (804) 798-0433

Waterford Foundation
P. O. Box 142
Waterford, VA 22190
Tel (540) 882-3018
Fax (540) 882-3921

Western Virginia Land Trust
P. O. Box 18102
Roanoke, VA 24014

Williamsburg Land Conservancy
P. O. Box 2000
Williamsburg, VA 23187
Tel (757) 565-0343
Fax (757) 253-1652

Funding Sources

American Greenways Awards Program

- Sponsored by the Eastman Kodak Company
- The Kodak Awards Program will continue to provide small grants (from $500 to $2,500) for greenway and trail projects throughout America.
- Applications are accepted between March 1 and June 1. Awards are announced in early Fall.
- For more information, please contact Kevin Houlihan, American Greenways Coordinator at 703.525.6300 or email at khoulihan@conservationfund.org.

Rivers, Trails and Conservation Assistance Program

- Offers assistance to projects by lending technical skills in planning, design, and organizing.
- Works with landowners, local business owners and private groups to help define goals, resolve issues, and reach agreement on how important areas may be improved or protected.
- Projects are selected annually on a competitive basis.
- For more information, please contact the National Park Service Rivers, Trails and Conservation Assistance Program, 215.597.7995.

Transportation Equity Act for the 21st Century (TEA-21)

- TEA-21 is a direct successor to ISTEA, leaving many of ISTEA's opportunities in tact and providing new opportunities for innovation.
- Pedestrian and bicycle facilities can be constructed with Congestion Mitigation Air Quality (CMAQ) allocations or Statewide/ Regional Surface Transportation Program (STP) allocations.
- Enhancement Funds are now guaranteed, although a portion of the funds can be "transferred" to other more traditional transportation projects.
- Allocations for STP or CMAQ vary by region; contact local Virginia Department of Transportation (VDOT) Residency office for more information regarding eligibility, allocation and funding request deadlines.
- Enhancement Grant filing deadline is generally January 31st. Applications and additional information may be obtained by contacting 800.444.7832.

Virginia Recreational Trails Fund Program

- Funded through TEA-21 and administered at the state level by the Department of Conservation and Recreation, Division of Planning and Recreation Resources.
- Program overview:
    1. motorized and non-motorized trail applications accepted;
    2. funding for 20% of project cost must come from applicant or sponsor;
    3. matching funds can include privately donated funds and fair market value of materials and services, including local parks and recreation work forces;
    4. projects that seek to maintain, improve and/or upgrade existing trails are encouraged.
- Application deadline: January 31. Request copy of application from Grants Administrator, Department of Conservation and Recreation, Division of Planning and Recreational Resources, 203 Governor Street, Suite 326, Richmond, VA 23219-2010.

Virginia Environmental Endowment (VEE)

- Grants are awarded to universities, citizens groups, public agencies, schools and conservation organizations to improve the quality of the environment through education. The mission of the VEE is to involve all sectors of the community to prevent pollution and conserve natural resources.
- Grant proposals are accepted for the Virginia Program and the Virginia Mini-Grant Program.
- Application deadlines: April 15, August 15 and December 15. Contact the Virginia Environmental Endowment at PO Box 790, Richmond, VA 23218-0790 for application brochure. Or call (804) 644-5000. Or visit their website at http://www.vee.org.
- Virginia Program Grant Applications
    1. Sustainable Communities
    2. Water Quality Protection
- Virginia Mini-Grant Program Applications
    1. Environmental Education
    2. Water Quality Protection

Virginia Department of Forestry: Urban and Community Forestry Assistance Grants

- Grant program is designed to encourage projects that promote tree planting and education related to developing sustainable urban forestry programs at the local level.
- Grants may be awarded to local governments, approved non-profit organizations, educational institutions, and others for proposal which meet some, or all of the program's objectives.
- Grant filing deadline is June 1 with notice approval by July 1.
- Contact Virginia Department of Forestry at 900 Natural Resource Dive, P.O. Box 3758, Charlottesville, VA 22903, or call Paul Revell, Urban and Community Forestry Coordinator 804.977.6555.

Appendix XXIII: Bibliography

This bibliography lists publications by title.

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AMC Field Guide to Trail Building and Maintenance. Proudman, R.D. and Rajala, R. Boston, MA: Appalachian Mountain Conference: 1984, Second Edition.

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Trail Design, Construction, and Maintenance. Appalachian Trail Conference

The Virginia Greenways and Trails Toolbox

A How-To Guide for the Organization, Planning, and Development of Local Greenway and Trails Programs in Virginia

October 2000

prepared for

Virginia Department of Conservation and Recreation
Virginia Trails Association

by

Parsons Harland Bartholomew & Associates, Inc.
Richmond, Virginia

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